GRADED LESSONS

IN

ARITHMETIC

BOOK V.

BY

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GENERAL INTRODUCTION.

1. These lessons have been prepared in the belief that it is a mistake to assume that one topic is to be finished before another is begun. The elements of many topics are here given in lower grades in explanations, illustrations, and examples easily understood by the younger pupils; and then the work in each topic is made more and more difficult through the various grades until it is finished. These examples have stood the test of the school-room, and in no case have they been found too difficult.

2. The arrangement of the topics is such that pupils in passing into a new grade find but few new topics, and many pupils are prepared for promotion from grade to grade at various times during the year, and are not obliged to wait for the annual promotions.

3. Such practical subjects as Percentage and Interest are introduced in the lower grades, where many pupils are found who are obliged to leave school before they reach the more advanced grades.

4. Clear conceptions of geometric forms and mensuration are introduced at an early period, that principles thus developed may be applied to many practical problems.

5. One or more lessons are given to the developing of a new topic; then the following lessons are so arranged as to give the pupils practice in applying the new topic in

all the other topics previously learned. A constant review will be found very beneficial.

6. Teachers will find the need of supplementary work, as so large a number of problems are given. On the other hand, few pupils should be required to solve all. It is a good way to assign for required work in class that number of examples which even the slowest child can do, and then allow any child to work the remaining examples of the lesson as optional work.

7. The large amount of oral or mental examples will be appreciated by those who believe that ten minutes each day should be given to work of this kind. These are not mental gymnastics, but plain, practical, every-day questions.

8. The introduction of Algebra and Geometry in the higher grades will be found beneficial.

9. The methods here advocated are the shorter methods found in daily use among bankers, mechanics, and merchants.

10. Commencing in Book IV., and continuing through the series, we have frequently given only statements of [illegible]. This tends to develop thought power, for the pupil must determine first what can be found, [illegible]

The author desires to express his acknowledgments for many valuable suggestions to Dr. C. H. Morss, Superintendent of Schools of Westfield, Mass.

WILBUR F. NICHOLS.

INTRODUCTION TO BOOK V.

THIS book contains a review of the work done in Book IV., the extension of the principles taught there to more difficult problems, and a few new topics.

Notation and Numeration receive more attention. The work in fractions is extended to include multiplication and division, using only small denominators. The subject of bills is introduced under the head of decimal fractions. The subject of Compound Numbers is enlarged, and includes their addition. Examples in Percentage previously performed by using the common fraction representing the per cent, are now solved decimally. The work in measurements, believed to be a valuable feature of the previous grades, is here extended to area of circles, cylinders, and cones.

Interest by an easy, short, and "business" method is taken up. The reason for introducing so many lessons of a miscellaneous character should not be overlooked. These lessons give a constant review, and are far more beneficial to a pupil than examples all classified and labeled for him.

TABLES OF WEIGHTS AND MEASURES

FOR REFERENCE.

LINEAR MEASURE.

12 inches (in.)	= 1 foot (ft.).	5½ yards, or 16½ feet	= 1 rod (rd.).
3 feet	= 1 yard (yd.).	320 rods, or 5280 feet	= 1 mile (m.).

SQUARE MEASURE.

144	square inches (sq. in.)	= 1 square foot (sq. ft.).
9	square feet	= 1 square yard (sq. yd.).
30¼ square yards, or 272¼ square feet		= 1 square rod (sq. rd.).
160	square rods	= 1 acre (a.).
640	acres	= 1 square mile (sq. m.).

SOLID OR CUBIC MEASURE.

1728	cubic inches (cu. in.)	= 1 cubic foot (cu. ft.).
27	cubic feet	= 1 cubic yard (cu. yd.).

WOOD MEASURE.

16	cubic feet	= 1 cord foot (cd. ft.).
8 cord feet, or 128 cubic feet		= 1 cord (cd.).

LIQUID MEASURE.

4 gills (gi.)	= 1 pint	(pt.).
2 pints	= 1 quart	(qt.).
4 quarts	= 1 gallon	(gal.).
1 gal.	= 231 cubic inches.	

DRY MEASURE.

2 pints (pt.)	= 1 quart	(qt.).
8 quarts	= 1 peck	(pk.).
4 pecks	= 1 bushel	(bush.).
1 bushel	= 2150.42 cubic inches.	

AVOIRDUPOIS WEIGHT.

16 ounces (oz.)	= 1 pound	(lb.).
2000 pounds	= 1 ton	(t.).
2240 pounds	= 1 long ton	

CIRCULAR MEASURE.

60 seconds (″)	= 1 minute	(′).
60 minutes	= 1 degree	(°).
360 degrees	= 1 circumference	(circ.).

MISCELLANEOUS TABLE.

12 units	= 1 dozen.
12 dozen	= 1 gross.
12 gross	= 1 great gross.
20 units	= 1 score.
24 sheets	= 1 quire.
20 quires	= 1 ream.

TIME MEASURE.

60 seconds (sec.)	= 1 minute	(m.).
60 minutes	= 1 hour	(h.).
24 hours	= 1 day	(d.).
7 days	= 1 week	(wk.).
365 days	= 1 common year	(c. yr.).
366 days	= 1 leap year	(l. yr.).
100 years	= 1 century	(C.).

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***MEASUREMENTS* (*Continued*).**

ORAL.

PERCENTAGE.

REVIEW, GENERAL.

GRADED LESSONS IN ARITHMETIC.

BOOK V.

LESSON 1.

ORAL.

1. 45 is $\frac{5}{9}$ of how many times 9?

2. 7 is what part of 21? 8 of 32? 9 of 27?

3. 7 is what per cent of 21? 8 of 32? 9 of 27?

4. A man paid $7.50 for a pair of boots, and $3.50 for a hat. How much did he pay for both?

5. A drover bought cows at $36.50 a head, and sold them at $40 a head. How much did he gain?

6. If a man earns $2.50 a day, how much will he earn in 2 days? 6 days? 10 days?

7. A man paid $32 for 8 tons of coal.

8. If a man earns $39 in 6 days, how much will he earn in a day? In 10 days?

9. At 25¢ a dozen, how many dozens of eggs can be bought for $2.00? $3.25? $4.50?

10. What will 120 spellers cost at 25¢ each? At 33⅓¢? At 50¢?

11. What is the cost of 96 doz. eggs at 33⅓¢ a dozen? At 25¢? At 20¢?

12. At 33⅓¢ a pound, how many pounds of butter can be bought for $5? $15? $30?

13. How many square inches in a rectangular piece of paper 4 in. long and 2 in. wide?

1. Add the following:

a	*b*	*c*	*d*
$2427.19	$2590.02	$1689.25	$2478.64
1068.73	9198.86	579.35	842.48
3684.15	558.95	64.28	4284.63
73.79	46.78	176.79	258.50
468.81	1467.26	4567.89	53.76
65.97	5251.24	738.47	485.37
8689.58	704.86	18.78	4876.95
981.12	3712.12	436.81	936.85
57.63	3068.75	6075.14	6588.79
1784.36	17.19	1483.81	507.54
267.71	489.76	748.41	7698.44
42.67	1234.56	2697.36	324.89
194.24	789.12	348.91	56.97

2. Subtract:

$4571.16	$2860.75	$4308.23	$2009.74
3461.19	1478.56	2849.17	1632.59

3. Multiply:

749 by 123	645 by 456⅛	1543 by 901
706 by 987	654 by 609⅛	3809 by 786
879 by 234⅓	798 by 807¼	2689 by 504

4. Divide:

866987 by 269	619115 by 665	352204 by 764
136160 by 368	360381 by 863	253006 by 962
191470 by 467	699624 by 738	735816 by 372

5. Divide:

106950 by 75	126618 by 94	262656 by 76
361437 by 57	429436 by 49	513282 by 66
727748 by 98	794061 by 83	522786 by 89

To find a part of a fraction, or to divide a fraction by an integer.

1. Divide 4 books by 2. Divide 4 ninths by 2.

$\frac{4}{9} \div 2 = \frac{4 \div 2}{9} = \frac{2}{9}$. This point should be illustrated by the fractional disks.

Perform the following examples by means of the disks:

1.	$\frac{3}{4} \div 3$	$\frac{2}{5} \div 3$	$\frac{8}{12} \div 4$	$\frac{12}{3} \div 6$
	$\frac{8}{9} \div 4$	$\frac{8}{8} \div 4$	$\frac{18}{8} \div 9$	$\frac{15}{4} \div 5$
	$\frac{5}{8} \div 5$	$\frac{10}{3} \div 5$	$\frac{48}{31} \div 8$	$\frac{6}{7} \div 3$
	$\frac{6}{7} \div 6$	$\frac{6}{5} \div 6$	$\frac{24}{63} \div 12$	$\frac{8}{11} \div 4$
	$\frac{7}{8} \div 7$	$\frac{14}{8} \div 7$	$\frac{66}{74} \div 22$	$\frac{12}{15} \div 6$
2.	$\frac{18}{23} \div 9$	$\frac{15}{6} \div 3$	$\frac{28}{8} \div 4$	$\frac{18}{10} \div 6$
	$\frac{10}{12} \div 5$	$\frac{11}{7} \div 11$	$\frac{27}{8} \div 9$	$\frac{32}{16} \div 8$
	$\frac{36}{7} \div 9$	$\frac{44}{8} \div 11$	$\frac{45}{2} \div 9$	$\frac{32}{3} \div 4$

3. Change mixed numbers to improper fractions before dividing:

$6\frac{2}{3} \div 4 = ?$	$8\frac{1}{3} \div 5 = ?$	$6\frac{3}{4} \div 9 = ?$	$11\frac{1}{5} \div 8 = ?$
$8\frac{3}{4} \div 5 = ?$	$5\frac{5}{8} \div 9 = ?$	$8\frac{3}{4} \div 7 = ?$	$3\frac{3}{7} \div 6 = ?$
$5\frac{8}{11} \div 12 = ?$	$4\frac{2}{3} \div 7 = ?$	$9\frac{3}{8} \div 15 = ?$	$12\frac{2}{4} \div 10 = ?$

4. Divide:

$10\frac{1}{2}$ by 7	$2\frac{2}{7}$ by 8	$5\frac{1}{4}$ by 3	$8\frac{3}{4}$ by 5
$9\frac{1}{3}$ by 4	$11\frac{2}{3}$ by 7	$6\frac{4}{7}$ by 23	$7\frac{4}{6}$ by 23
$6\frac{3}{4}$ by 9	$7\frac{1}{3}$ by 11	$11\frac{1}{4}$ by 9	$5\frac{2}{8}$ by 16

5. Divide:

$\frac{19}{13}$ by 5	$\frac{12}{17}$ by 3	$\frac{24}{25}$ by 8	$\frac{34}{35}$ by 17
$\frac{13}{17}$ by 4	$\frac{14}{15}$ by 7	$\frac{25}{26}$ by 5	$\frac{35}{36}$ by 7
$\frac{48}{49}$ by 12	$\frac{15}{17}$ by 5	$\frac{26}{27}$ by 13	$\frac{36}{37}$ by 9

6. Divide:

$\frac{21}{23}$ by 7	$\frac{18}{19}$ by 9	$\frac{28}{29}$ by 7	$\frac{32}{40}$ by 13
$\frac{15}{16}$ by 5	$\frac{20}{21}$ by 5	$\frac{30}{31}$ by 10	$\frac{40}{41}$ by 8
$\frac{35}{36}$ by 7	$\frac{21}{23}$ by 3	$\frac{32}{33}$ by 8	$\frac{42}{43}$ by 7

7. Formulate a rule for finding a part of a fraction.

LESSON 4.

DIVIDE AN INTEGER BY A FRACTION.

First change the integer to a fraction whose denominator is the same as that of the divisor. 20 equals $\frac{20}{1}$. $\frac{20}{1}$ and $\frac{3}{4}$ being like fractions are divided like integers. 80 divided by 3 equals 26.

$\frac{1}{4} =$
$\frac{3}{4} =$
$\frac{20}{1} \div \frac{3}{4} = 26\frac{2}{3}$

1. Divide:

12 by $\frac{3}{4}$	7 by $\frac{3}{5}$	8 by $\frac{3}{7}$	10 by $\frac{3}{8}$
5 by $\frac{4}{5}$	8 by $\frac{4}{5}$	10 by $\frac{4}{5}$	7 by $\frac{4}{5}$

2. Divide:

40 by $\frac{4}{5}$	55 by $\frac{5}{6}$	68 by $\frac{7}{10}$	75 by $\frac{7}{16}$
62 by $\frac{31}{32}$	15 by $\frac{3}{4}$	16 by $\frac{3}{4}$	20 by $\frac{5}{6}$

3. Divide:

45 by $\frac{9}{10}$	60 by $\frac{5}{6}$	21 by $\frac{7}{8}$	42 by $\frac{7}{8}$
30 by $\frac{5}{8}$	40 by $\frac{5}{9}$	16 by $\frac{5}{8}$	12 by $\frac{5}{8}$

Change mixed numbers in your divisors to improper fractions.

4. Divide:

8 by $1\frac{1}{3}$	4 by $1\frac{1}{2}$	6 by $2\frac{1}{2}$	7 by $4\frac{1}{2}$
9 by $6\frac{3}{4}$	9 by $5\frac{1}{4}$	12 by $6\frac{3}{4}$	7 by $2\frac{1}{3}$

5. Divide:

8 by $10\frac{1}{2}$	12 by $5\frac{1}{2}$	4 by $2\frac{1}{2}$	5 by $2\frac{1}{2}$
4 by $3\frac{1}{4}$	12 by $2\frac{1}{4}$	8 by $2\frac{3}{4}$	20 by $\frac{1}{2}$

6. Divide:

210 by $\frac{1}{4}$	896 by $5\frac{1}{2}$	57 by $6\frac{1}{2}$	275 by $30\frac{5}{8}$
860 by $8\frac{1}{4}$	42 by $4\frac{1}{2}$	76 by $4\frac{3}{8}$	16 by $\frac{2}{7}$

7. Formulate a rule for dividing an integer by a fraction.

8. Multiply:

$\frac{1}{4}$ by 96	$24\frac{1}{8}$ by 18	$69\frac{3}{7}$ by 42
128 by $\frac{3}{4}$	$111\frac{1}{4}$ by 28	67 by $\frac{15}{16}$
$3\frac{1}{2}$ by 72	$17\frac{1}{4}$ by 6	$\frac{7}{8}$ by 64

9. Divide:

8 by $\frac{1}{4}$	$1\frac{1}{8}$ by 4	12 by $\frac{3}{4}$
$\frac{4}{5}$ by 10	$3\frac{1}{2}$ by 5	5 by $1\frac{1}{4}$
$8\frac{3}{4}$ by 11	$4\frac{1}{2}$ by 7	$24\frac{1}{2}$ by 5
$6\frac{1}{4}$ by 9	$22\frac{1}{2}$ by 9	15 by $3\frac{3}{4}$

10. Subtract:

$31\frac{1}{4}$	$63\frac{1}{2}$	$38\frac{1}{16}$	$53\frac{3}{4}$	$92\frac{3}{16}$
$27\frac{1}{16}$	$44\frac{3}{4}$	$27\frac{1}{8}$	$27\frac{1}{2}$	$68\frac{1}{4}$

ORAL.

1. How many months in $\frac{1}{3}$ of a year? $\frac{3}{4}$ of a year? $\frac{5}{6}$ of a year?

2. How many hours in $\frac{5}{6}$ of a day? $\frac{7}{8}$ of a day? $\frac{7}{12}$ of a day?

3. How many months in .25 of a year? In .33$\frac{1}{3}$ of a year?

4. What part of a day is 6 hours? 9 hours? 12 hours?

5. How many square inches in the surface of a brick 8 in. long, 4 in. wide, 2 in. thick?

6. What per cent of $50 is $5? $10? $25?

7. If a merchant bought a piece of cloth for $80, and sold it at 25% profit, for how much did he sell it?

8. A merchant bought hats at $5 each, and sold them at 20% profit. What was the selling price?

9. A merchant bought hats at $5 each, and sold them at a loss of 20%. What was the selling price?

10. When cloth, costing $5 a yard, is sold for $4 a yard, what is the loss per cent?

11. If a merchant sells cloth, costing $4 a yard, for $5 a yard, what per cent does he gain?

12. If a man sold shoes at a profit of $2 a pair, and gained 20%, how much did they cost?

13. How must muslin that costs 10 cents a yard be sold to gain 20%? That costs 15 cents? 20 cents?

14. $\frac{3}{5}$ of 27 is $\frac{3}{7}$ of what number?

15. $\frac{5}{8}$ of 81 is $\frac{9}{10}$ of what number?

16. $\frac{2}{7}$ of 21 is $\frac{3}{4}$ of what number?

17. 18 is $\frac{2}{3}$ of how many?

18. 24 is $\frac{3}{8}$ of how many?

19. 40 is $\frac{5}{6}$ of how many times $\frac{1}{3}$ of 10?

20. If 4 chickens cost 9 dimes, what will 1 chicken cost?

21. What will 1 lb. of prunes cost if 5 lb. cost 48 dimes?

22. If 3 apples cost $\frac{2}{7}$ of a cent, what will 7 apples cost?

LESSON 6.

1. "average."

re were 48 present in a class on Monday, 52 on Tues-
on Wednesday, 47 on Thursday, 38 on Friday. What
average number present each day?

48
52
47
38
By adding the numbers present on each day, we find there were
230 pupils present for the 5 days. If there were 230 pupils pre-
sent in 5 days, it would be the same as 46 pupils for each one of
the five days.

5)230
46

2. A lady bought one pound of tea for 55 cents, and one pound for 75 cents. What was the average price per pound?

3. If there are 280 pupils in school Monday, 295 Tuesday, 312 Wednesday, 303 Thursday, and 275 Friday, what is the average attendance for the week?

4. What is the average price of 5 horses, if 3 of them cost $150 each, and the others $200 each?

5. What is the average price of 6 horses costing $135, $140, $150, $175, $250, $266 respectively?

6. Find the cost of the following:

   a. 45 houses at $4,350 each.

   b. 1,348 lb. at 4½¢ a lb.

   c. 365 lb. at 5¢ a lb.

   d. 48 yd. at $.26½ a yd.

   e. 476 bbl. of pork at $11.75 a barrel.

7. If a passenger car costs $1,750, and a freight car $475, what is the value of the cars in 2 trains, consisting of 7 passenger cars and 25 freight cars?

8. If it requires 1,345 pickets to fence one side of a square lot, how many pickets will be required to fence 15 such lots?

9. How many ounces in 3,240 pounds?

10. Find the area of the surface of a square pyramid, whose base is 14 ft. and slant height 24 ft.

11. If 5 lb. of sugar cost 8⅓ cents, what will 27 lb. cost?

1. Multiply:

46.83	58.09	83.07	65.80	38.87
38	57	49	68	94

2. Multiply:

6.4	308.3	70.56	308.8	7.08
.5	.4	.06	.46	.03

3. Multiply:

.03 × 14.6	.7 × .08	.08 × .06	90.06 × .03
6.03 × 4.6	4.1 × .4	7.5 × .02	20.05 × .5

4. Divide:

6.04 by .08	18.03 by .03	7.14 by .07	.6 by .01
3 by 1.2	40.8 by 1.6	.05 by .025	20 by .05

5. Divide: .08 by 4, by .4, by .04, by .004.
6.03 by 3, by .3, by .03, by .003.

6. How many miles in 640 rd.? 5,280 ft.? 3,520 yd.? 21,120 ft.?

7. How many square feet in the walls and floor of a room 20⅓ ft. long, 15 ft. wide, and 12 ft. high?

8. How many square yards in the walls of a room 18 ft. long, 12 ft. wide, and 9 ft. high?

9. How many reams and quires in 11,520 sheets of paper?

10. If there are 150 pound packages of tacks in a box, what will be the weight of 18 boxes? What are the tacks worth at 9½¢ a pound?

11. If 2½ lb. of butter cost 60 cents, what will 8⅓ lb. cost?

12. J. Ward worked 9 hours Monday, 11 hours Tuesday, 10 hours Wednesday, 8 hours Thursday, 8 hours Friday, and 6 hours Saturday. If 10 hours' labor is considered a full day, how much did he earn during the week at $2.50 a day?

13. What must be paid for 42 rd. 3 yd. 2 ft. of iron fence at 65¢ a foot?

TO CHANGE A DECIMAL FRACTION TO A COMMON FRACTION.

1. Is there any difference in value between $\frac{1}{10}$ and .1?

2. Is there any difference in value between $\frac{1}{100}$ and .01?

3. What is the difference between a decimal fraction and a common fraction?

4. What rule can you give for changing all decimals to common fractions?

5. Write the following decimals as common fractions, and then reduce them to their lowest terms:

.6	.05	.10	.8	.15	.20	.12	.2
.3	.02	.50	.9	.75	.80	.40	.5

6. Change the following:

.125	.350	.60	.7	.475	.245
.148	.412	.55	.4	.145	.366

7. If \$448 is paid for 28 tons of hay, what is the price a ton?

8. The cost of a piece of cloth was \$112.70, and the price was \$2.45 a yard. How many yards in the piece?

9. A man bought 225 acres of land at \$15 an acre, and sold the whole for \$3,125.

10. Bought a farm for \$3,695, spent \$947 in improvements, and sold it for \$4,267.

11. A merchant bought 120 overcoats at \$15.85 each. He sold $\frac{1}{2}$ of them at \$25 each, and the others he sold in a lot for \$820. How much did he gain or lose?

12. Multiply:

$221\frac{1}{2}$ by 4	264 by $2\frac{1}{2}$	$201\frac{1}{2}$ by 10
$362\frac{1}{3}$ by 3	363 by $3\frac{1}{3}$	$403\frac{3}{8}$ by 12
$655\frac{2}{3}$ by 6	244 by $4\frac{3}{4}$	$621\frac{1}{8}$ by 18
$421\frac{3}{8}$ by 5	325 by $5\frac{3}{8}$	$369\frac{3}{8}$ by 25

13. Divide:

25 by $2\frac{1}{2}$	$213\frac{1}{2}$ by 4	$263\frac{1}{2}$ by 12
39 by $3\frac{1}{4}$	$321\frac{1}{3}$ by 3	$321\frac{1}{3}$ by 18
28 by $3\frac{3}{8}$	$622\frac{1}{4}$ by 5	$420\frac{3}{8}$ by 16
46 by $1\frac{1}{2}$	$220\frac{1}{2}$ by 6	$332\frac{3}{4}$ by 22

1. Find the cost of:

1,850 lb. of ice @ 35¢ a hundred pounds.

635 lb. of wheat @ $1.12 a hundred pounds.

100 lb. (1 cwt.) of ice @ $3.50 a ton.

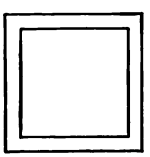
2. A rectangular lot of land is 200 ft. long and 4 rd. wide. What is its perimeter? How many square feet are there in it? How many square yards? Square rods?

3. How much change from two one hundred dollar bills should I receive after paying for 390 lb. of sugar at 7½¢ a pound, and 16 bbl. of flour at $6.25 a barrel?

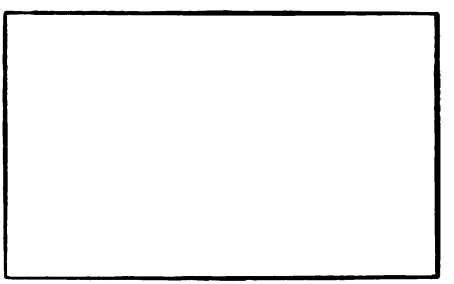
4. The earth's diameter is about 7,924 miles. How many hours would it take a train of cars to go round the earth at the rate of 48 miles an hour? How many days?

5. If the cotton crop of the United States is 6,000,000 bales, and each bale weighs 440 pounds, what is the weight of the whole crop? What is the value of the crop at 17 cents a pound?

6. A rectangular lot of land is 180 ft. long and 132½ ft. wide. How many feet of fence will it take to fence it? How much is the lot worth at 25¢ a square foot?



7. This diagram represents a square garden 40 ft. long, with a gravel walk round it 4 ft. wide. How many square feet are there in the walk? How many feet of fence will be required to build a fence round the outside of the walk?



8. The opposite diagram represents the floor of a room, and is drawn to a scale of ⅛ in. to a foot. Find the number of square feet in the floor.

ORAL.

1. Compare a cubic foot and a cubic yard.

2. How many pieces of ribbon $\frac{3}{4}$ yd. long can be cut from 9 yards?

3. How many inch cubes will a 2-in. cubical box hold? A 4-in. cubical box?

4. At $2 a thousand, what will 1,500 cu. ft. of gas cost?

5. 32 pounds is $33\frac{1}{3}\%$ of George's weight.

6. Find the cost of:

$\frac{3}{4}$ yd. of cloth at 12¢ a yd. $8\frac{1}{2}$ lb. beef at 12¢ a lb.

$1\frac{2}{3}$ yd. ribbon @ 18¢ a yd. 6 lb. steak @ $16\frac{2}{3}$¢ a lb.

7. How many square yards in a tablecloth 72 in. wide and $4\frac{1}{2}$ yd. long?

8. What per cent of a 2-in. square is a square inch? Are 2 square inches?

9. What per cent of a 2-in. cube are 2 cubic inches?

10. What part of 24 is 18? What per cent is it?

11. A boy had 20 cents and lost 16 cents. What part of his money had he left? What per cent had he left?

12. If in an arithmetic test you answer correctly 8 questions out of 10, what part do you have right? What per cent do you have wrong?

13. What per cent of the months have 30 days?

14. 12 cents is 4% of Jennie's money.

15. 12 is $\frac{1}{4}$ of what number?

16. 12 is 25% of what number?

17. 12 is .25 of what number?

18. 21 is 7% of what number?

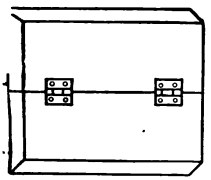
19. 21 is .07 of what number?

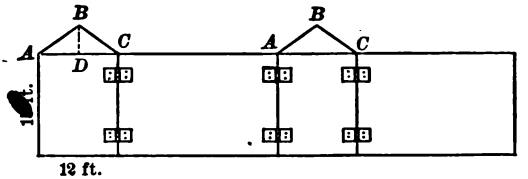
20. What is 9% of 200? 600? 3,000?

21. What is $66\frac{2}{3}\%$ of 12? 36? 300?

22. Find the perimeter of a square 2 ft. 4 in. long.

23. What will 2 lb. 2 oz. of butter cost at 32¢ a pound?





This drawing represents the roof and walls of a house. The triangular part, ABC, is called the "gable." When the line BD is $\frac{1}{2}$ the width of the house, the roof is said to have a $\frac{1}{2}$ pitch; when $\frac{1}{3}$ the width, a $\frac{1}{3}$ pitch; when $\frac{1}{4}$ the width, a $\frac{1}{4}$ pitch, etc.

To find the area of the gables you must find the area of how many triangles?

1. Find how many square feet of boards will be needed to cover the ends of this house. This house has a $\frac{1}{4}$ pitch.

2. If this house is 24 feet long, find the number of square feet of boards needed to cover the sides of the house.

3. If the rafter is 16 ft. long (the line BC represents the rafter), how many square feet of boards will cover the roof?

4. How many square feet of boards will be needed to cover the whole house?

5. Make drawings to represent the end, sides, and roof of a house, 42 ft. long, 36 ft. wide, and 18 ft. posts (18 ft. from ground to eaves), the roof to have a one-third pitch, the rafter to be 20 ft. long. Find the number of square feet of lumber needed to board and roof the house.

6. For a house 40 ft. by 30 ft., with 18 ft. posts. The roof has a $\frac{1}{3}$ pitch, and the rafter is 21 ft. long.

7. For a house 30 ft. by 24 ft., with 20 ft. posts. The roof has a $\frac{1}{4}$ pitch, and the rafter is 15 ft. long.

8. For a house 90 ft. by 60 ft., with 24 ft. posts. The roof has a $\frac{1}{2}$ pitch, and the rafters are 36 ft. long.

NOTE. — Let some pupil make a small model of a house out of thin wood. Fasten together with hinges, as indicated in the illustration.

1. How long is a freight-train of 36 cars, allowing 33 ft. for the length of each car and 2 ft. for the distance between the cars?

2. The highest mountain peak in North America is 19,000 ft. high; in South America, 23,910 ft.; in Europe, 18,526 ft.; in Asia, 29,002 ft.; in Africa, 19,600 ft.; in Oceania, 13,760 ft. What is the height in miles of each of the peaks?

3. John earns $4.80 in a week. How much can he earn in 5 wk. 4 days? How many days will it take him to earn $16.80?

4. 54 cd. of wood at $4.60 a cord are worth how much more than 135 doz. eggs at 27¢ a dozen?

5. A man deposited in the bank $1,840, and drew out by check the following sums: $35.48, $143.18, $216.09, $5.49, $43.69, $78.23, $25. How much has he left in the bank?

6. The salary of the President of the United States is $50,000 a year. What is his salary for a day?

7. What per cent of a square foot is 96 square inches?

8. What per cent of a mile is 64 rods?

9. Wood costs me $6.75 a cord. What shall I ask for it to gain 25%?

10. If a merchant buys flour for $6.00 a barrel, and sells it for $7.20 a barrel, what per cent does he gain?

11. How much is left after spending 7% of $825?

NOTE. — Consider 7% as the decimal .07. All per cents not easily changed to such common fraction as ½, ⅓, ¼, etc., should be considered as decimals. This involves no new principle.

12. Find 27% of $864.50.

13. Find 18¾% of $1,680.50.

14. Find 75% of 487 bushels.

15. Find 5% of 360 feet.

16. How many cubic feet of bricks in a pile 8 ft. long, 4 ft. high, and 3 ft. wide? If 27 bricks make a cubic foot, how many bricks are there in the pile?

To find the diameter of a circle when the circumference is given.

1. The circumference is how many times larger than the diameter.

2. If the circumference is $3\frac{1}{7}$ times larger than the diameter, how can you find the diameter when the circumference is given?

3. If the circumference is 22 ft., what is the diameter?

4. If it is 66 ft. round the outside of a circular flower-bed, how many feet is it across it through the center?

5. If the circumference of a circular fountain is 44 ft., how many feet long is the diameter?

6. If it is 88 in. round a circular table, how many inches is it from side to side through the center?

7. If it is 264 in. round a smoke stack, how many inches is the diameter of the stack?

8. The circumference is 198 ft. Find the diameter.

9. Find the diameter of a circle whose circumference is 132 in.

10. How many feet long will be the diameter of a circle, if the circumference is 220 feet?

11. If the circumference is 154 ft., what is the diameter?

12. The circumference is 110 ft. The diameter is —— ft.?

13. How many yards will it be through the center of a circular park, if it is 242 yards round it?

14. If a fence round a circular field is 330 yd. long, how long is a fence running through the center that divides the field into two equal parts?

15. Find the diameter when the circumference is 396 in.

16. How many feet long will be the diameter of a circle, if the circumference is 363 ft.?

17. When the circumference is 176 ft., what is the diameter?

18. Find the diameter when the circumference is 198 ft.

19. Find the diameter when the circumference is 232 rd.

1. Find the number of square feet of boards needed to board and roof a house 40 ft. long, 20 ft. wide, with 15 ft. posts. The roof has a one-fourth pitch, and the rafters are 14 ft. long.

2. A wood-shed is 40 ft. long, 12 ft. wide, and 16 ft. high. How many cords of wood can be piled into it?

3. If there is a tower in the form of a square pyramid on your schoolhouse, each side 15 ft., and if its slant height is 15 ft., how many sq. ft. of tin are needed to cover it?

4. If the circular flower-bed in your school-yard is 7 ft. in diameter, what is its circumference?

5. The three dimensions of a box are 12 in., 10 in., and 8 in. What are its contents in cubic inches?

6. A bank has $24,726 in its safe or vault. One-half is in bank-bills, one-third is in gold, and the rest in silver. What is the value of the silver?

7. Change to improper fractions:

$627\frac{5}{8}$, $327\frac{3}{4}$, $15\frac{1}{12}$, $18\frac{7}{16}$, $27\frac{3}{5}$.

8. Add: $21\frac{1}{6}\frac{5}{8}$ and $18\frac{1}{2}$. $91\frac{4}{5}$ and $62\frac{1}{3}$. $83\frac{7}{8}$ and $39\frac{5}{6}$. $114\frac{4}{5}$ and $72\frac{3}{10}$. Subtract the second from the first in each case.

9. Find the cost of:

$16\frac{2}{3}$ yd. @ $2.75 64 yd. @ 0.31\frac{1}{4}$

$18\frac{5}{8}$ doz. @ 28¢. 42 books @ 0.26\frac{3}{4}$

10. Change to common fractions:

.80, .125, .375, .675, .875, .0125, .0625, .025, .640, .95, .75.

11. Multiply: .3 by .273 6.5 by 37.2 .8 by 6.4

4.5 by 90.8 .08 by 9.6 .26 by 37.5

12. Cloth costing $16.85 is sold at a loss of 8%.

13. Hay costing $16.85 is sold at a loss of 15%.

14. How shall I sell goods that cost $1.40 so as to gain 10%?

15. A merchant sold a quantity of flour at $4.00 a barrel. How many barrels did he sell if he received $1,908 for them?

16. Find the wages due a workman, who has worked 351 hours at $1.75 a day, of 9 hr. each.

ORAL.

1. Mr. Smith having a pound of candy, said, "I will give Nellie $\frac{1}{4}$, and Jennie $\frac{1}{3}$, and George $\frac{1}{6}$, and the rest shall go to Charles, if he can tell how to divide it." If you were Charles, how would you divide it?

2. If you had a quart of chestnuts, and wanted to give $\frac{1}{2}$ to one boy, $\frac{1}{4}$ to another, and $\frac{1}{8}$ to another, how would you do it without dividing the quart into eighths?

3. If $\frac{1}{2}$ of a barrel of beans cost $\$2\frac{1}{4}$, how much will a barrel cost?

4. If $\frac{1}{3}$ of a barrel of pork costs $\$4\frac{1}{2}$, what will 1 barrel cost?

5. 12 is $\frac{1}{3}$ of what number? 10 is $\frac{2}{7}$ of what number?

6. If a peck of potatoes lasts a family 2 weeks, how many weeks will 2 bushels last them?

7. Bought an orange for 4 cents, and sold it for 6 cents. What was the gain per cent?

8. A merchant bought a hogshead of molasses for $\$80$, and sold it for $\$95$. What did he gain per cent?

9. Two boys had each an equal number of blocks. One lost 4, and then together they had 12. How many had each at first?

10. George, after eating $\frac{1}{3}$ of all his oranges, had 8 remaining. How many had he at first?

11. A pole is standing in the water so that 15 feet are above the water. If the part above the water is $\frac{2}{7}$ of the length of the pole, how long is the pole?

12. If 8 horses in one day eat 4 bu. of oats, in how many days can one horse eat 1 bushel?

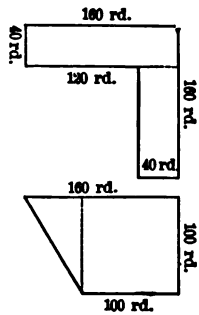
13. $\frac{8}{9}$ of 72 is $\frac{2}{3}$ of how many?

14. $\frac{5}{6}$ of 12 is $\frac{2}{5}$ of how many?

15. $\frac{3}{4}$ of 20 is $\frac{3}{5}$ of how many?

16. $\frac{2}{5}$ of 20 is $\frac{2}{3}$ of how many?

17. If 6 men can do a piece of work in 8 days, how many men can do it in 16 days? In 4 days?



1. Here is a diagram of Mr. [redacted]dwell's farm. How many acres are there in it?

2. The second figure is a diagram of Mr. Morse's farm. Find how many acres he has.

3. Mr. Smith has 4 fields. The first field is 40 rd. square. The second field is 80 rd. long and 20 rd. wide. The third field is 100 rd. long and 16 rd. wide. The fourth field is 400 rd. long and 10 rd. wide. How many acres of land has Mr. Smith?

4. Find the perimeter of Mr. Bardwell's farm. Of each field of Mr. Smith's farm.

5. A farmer wishes to make a grain box 8 ft. long, 5 ft. wide, and 4 ft. deep. How many square feet of boards will be needed for the box?

6. How many square feet of boards will be needed to roof and board a barn 50 ft. long, 32 ft. wide with 20 ft. posts, the roof having a one-fourth pitch, and the rafters being 20 ft. long?

7. At $5 a cord, what is the worth of 4 piles of wood, each 24 ft. long, 8 ft. high, and 4 ft. wide?

8. What will 2 lb. of cinnamon cost at 5¢ an ounce?

9. From a bin containing $30\frac{1}{4}$ bu. of corn, $15\frac{1}{4}$ bu. were taken out. How many bushels remained in the bin?

10. If $29\frac{1}{16}$ yd. are sold from a piece of muslin containing $48\frac{1}{8}$ yd., how many yards are left?

11. A man spent $\$11\frac{7}{8}$. If he had $\$15\frac{3}{4}$ at first, how much has he now?

12. Add $\frac{7}{32}$, $\frac{1}{2}\frac{3}{2}$, $\frac{3}{8}$, $\frac{7}{8}$.

13. One day in winter two boys were standing on the shore of a circular pond, 143 rd. in circumference. To reach a point directly opposite them, one boy went round by the shore, the other through the center. How much farther did one boy walk than the other?

NOTATION AND NUMERATION.

Writing numbers by means of characters is Notation.

Reading numbers written in characters or figures is Numeration.

We use the Arabic system of Notation, so called because the Arabs are supposed to have introduced these characters into Europe.

The system employs ten characters called figures.

For convenience in reading and writing numbers, the figures of a number are divided into periods of three figures each.

Hundred Millions.	Ten Millions.	One Million.	Hundred Thousands.	Ten Thousands.	One Thousand.	Hundreds.	Tens.	Units.	•	Tenths.	Hundredths.	Thousandths.	Ten-thousandths.	Hundred-thousandths.	Millionths.
4	6	8,	7	6	8,	4	7	5	.	6	4	8,	7	9	1

NOTE. — The fourth period is called billions, the next trillions, and the third period of decimals is called billionths.

1. Read the following:

105,436,163.003,204.	468,242,039.206 075.
4,609.00108.	5,073.001406.
200,173.40062.	4,000.0004.
50,000.0005.	1,080.0076.

NOTE. — Do not use *and* in reading whole numbers. In reading, *and* takes the place of the decimal point.

Write:

2. Three hundred million, ninety thousand, four, and seventy-six thousandths.

3. Five hundred thirty-eight million, two hundred ten thousand, nine hundred fifty-three, and one hundred six ten-thousandths.

NOTATION AND NUMERATION.

1. Name the periods in order from units to millions.

2. Name the places in order from units to millions, and from units to millionths.

3. Write:

Three million, forty thousand, two hundred four; two hundred thousand forty; twenty thousand one hundred one; sixteen thousand ten.

4. Write:

Three million, seventy-one thousand, seventy and twelve thousandths; six hundred thousand, seven hundred forty-eight, and five ten thousandths; forty-nine thousand eight and one hundred five millionths; three hundred sixty thousand twenty-eight and twenty-five hundred thousandths; thirty million two hundred seven thousand forty-three and twenty-one hundredths.

5. Read the following numbers:

401,420,401.004.	64,064,640.0064.
60,600,060.0606.	55,055,505.055.
300,700,600.0605.	200,142,061.0402.
92,084,146.00075.	610,203,241.604.

Write in figures:

6. Six million, six thousand, six and six millionths.

7. Eight hundred forty million, four hundred six thousand, two hundred, six and one hundred twenty-four ten-thousandths.

8. Multiply eighty thousand nine hundred seventy-six by twenty thousand eight.

9. Multiply thirty-four thousand, eighty-six by ten thousand three hundred six.

10. Divide nine million, eight hundred sixty-one thousand, five hundred fifty-seven by four thousand sixty-nine.

11. Divide two million, seven hundred seventy-five thousand, five hundred thirty-eight by eight thousand three hundred seven.

To find the area of a circle.

Fig. 1.

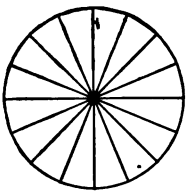
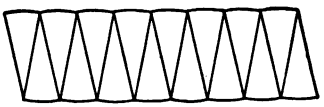


Fig. 2.



1. Take a paper disk, whose diameter is 7 in., cut it into 16 equal parts. Arrange your parts like Fig. 2.

2. Into what shape, nearly, have you changed your circle?

3. If you had cut your circle into a greater number of parts, and arranged them as in Fig. 2, which figure would come the nearer to being a paralellogram?

4. Are there as many square inches in Fig. 2 as in Fig. 1?

5. The length of your rectangle (Fig. 2) was what of your circle (Fig. 1)?

6. The width of your rectangle was what of your circle?

7. How do you find the area of the rectangle (Fig. 2)?

8. If Figs. 2 and 1 have the same area, have you found the area of the circle?

9. State a rule for finding the area of circles.

10. What dimensions of the circle do you need to know?

11. Can you find any dimension when one is given? How?

Find the area of the following:

12. A circle whose diameter is 14 ft.

13. A circle whose circumference is 22 ft.

14. A circle whose radius is 14 ft.

15. A circle whose diameter is 21 ft.

16. A circle whose circumference is 66 ft.

17. A circle whose circumference is 110 ft.

18. A circle whose diameter is 63 ft.

ORAL.

1. How many are $\frac{3}{8}$ of \$40?

2. How many are $40 \times \frac{3}{8}$?

3. How many are 60% of 40?

4. What per cent of 10 yd. is 3 yd.? 5 yd.? 7 yd.?

5. What is 25% of 460 pounds?

6. What is 7% of 600 bushels? First find 1%.

7. What is 8% of 1000 rods? First find 1%.

8. From a school of 750 pupils 20% were absent. How many were present?

9. What per cent of 150 is 30?

10. What per cent of 18 is 6?

11. A man bought a farm of 200 acres, and sold 50 acres of it. What per cent of his farm did he sell?

12. A man bought a cow for \$35, and sold her at 20% profit. How much did he gain? For how much did he sell her?

13. A grocer bought flour at \$4 a barrel, and sold it at 25% loss. How much did he lose? For what did he sell it?

14. Bought a horse for \$200, and sold it for \$50 less than cost. What part did I lose? What per cent did I lose?

15. If you buy tea at 60¢ a pound, and sell for 80¢ a pound, how many cents will you gain? What part will you gain? What per cent?

16. If you buy a rubber ball for 8 cents, and sell it for 6 cents, how many cents will you lose? What part will you lose? What per cent?

17. If you buy an orange for 4 cents, how many cents must you gain to make 50%?

18. One man can earn \$10 in one week. What is true of 5 weeks? 12 weeks? 20 weeks? 8 men? 12 men? 20 men?

19. A trunk that cost \$9 sold for \$15. What was the per cent of gain?

20. 6 times 10 and $\frac{3}{8}$ of 10 are how many?

TABLE OF CUBIC MEASURE.

1. How many inches in a foot?

2. How many square inches in a 12 in. square?

3. How many cubic inches in a 12 inch cube?

4. How many feet in a yard?

5. How many square feet are there in a square yard?

6. A cubic yard is how long? How wide? How high? How many cubic feet then are there in it?

7. Learn this:

1728 cubic inches (cu. in.) 1 cubic foot (cu. ft.)
27 cubic feet 1 cubic yard (cu. yd.)

8. Find the number of cubic feet of water in a rectangular cistern 12 ft. long and 9 ft. wide, if the water is 7 ft. deep?

9. How many two-inch cubes are there in a rectangular block of marble 2 ft. long, 18 in. wide, and 12 in. thick?

10. How many cords in 640 cubic feet?

11. How many cords in 2 piles of 4 foot wood 16 ft. long and 8 ft. high? What is it worth at $6.25?

12. What will a pile of wood 12 ft. by 6 ft. by 4 ft. cost at $8 a cord?

13. What must I pay for a pile of 4-foot wood 6 ft. high and 12 ft. long at $6 a cord?

14. How many cords can be piled on a car 18 ft. long, 8 ft. wide, and 7 ft. high?

15. How many cubic feet of earth will be removed in digging a cellar 20 ft. long, 15 ft. wide, and 9 ft. deep. If a cubic yard makes a load, how many loads are there?

16. Compare a 4-foot cube with an 8-foot cube in length, surface, and contents.

17. What part of a cord is 96 cu. ft.?

18. Find the cost of digging a cellar 48 ft. long, 30 ft. wide, and 6 ft. deep at 18¢ a cubic yard, and of flooring it with cement at 12¢ a square yard.

ORAL.

1. How many square feet in a blackboard 8 ft. long and $3\frac{1}{2}$ ft. wide?

2. In 20 qt. how many gallons?

3. How many quarts in 5 pk.? 9 pk.?

4. A man laid out \$50 in vests, which were \$5 each. How many did he buy?

5. 16 is $\frac{4}{5}$ of what number?

6. Add 7 to 15; divide by 11; multiply by 9; add 10; divide by 7; multiply by 12; add 11; subtract 4; divide by 5; multiply by 8; give result.

7. Multiply 8 by 7; subtract 6; divide by 10; multiply by 9; add 11; divide by 8; multiply by 9; subtract 3; add 30; subtract 7; result.

8. Divide 39,467 by 1,000.

9. Divide 48,000 by 1,000.

10. 5 cents is 10% of the money in my pocket. How much money have I?

11. If a line is 5 in. long, how long will it be when 20% has been added to its length?

12. 8 is $12\frac{1}{2}$% of what number?

13. A merchant sells 21 yd. of silk for a dress. How many yards are in a piece from which he can sell 4 dresses?

14. A man had 96 hens; he sold 84. What part of the whole number had he left? What per cent had he left?

15. 28 qt. of berries are worth how much at \$1.00 a peck?

16. If 2 yd. of silk cost \$4, what will 16 yd. cost?

17. How many inches are there in one-half of a square foot?

18. Which is larger, a flower bed that contains 3 square feet, or one that is 3 ft. square? How much larger is it?

19. At 10¢ a quart, how many pecks of nuts can be bought for 80 cents?

To multiply and divide when multipliers and divisors have ciphers at the right.

Multiply 24 by 1,200.

$$\begin{array}{r} 24 \\ 1200 \\ \hline 48 \\ 24 \\ \hline 28800 \end{array}$$

Divide 2,899 by 1,300.

$$\begin{array}{r} 2.23 \\ 13.00\overline{)\,28.99} \\ 26 \\ \hline 29 \\ 26 \\ \hline 39 \\ 39 \\ \hline \end{array}$$

1. Multiply 4,763 by 2,000; by 1,200.
2. Divide 64,782 by 2,000.
3. Divide 46.0076 by 400.

Multiply:

4.	5.	6.
794 by 400	9,797 by 4,000	1.06 by 200
789 by 300	6,468 by 8,000	5.078 by 60
988 by 700	1,895 by 6,000	9.248 by 1,000
776 by 500	6,759 by 9,000	63.75 by 400

Divide:

7.	8.	9.
3,840 by 120	3,600 by 1,800	7,980 by 190
145,600 by 1,300	53,040 by 170	6,001 by 1,700
28,990 by 130	760,000 by 1,900	95,040 by 45,000
282,500 by 2,500	316,800 by 2,400	4,899 by 230

Divide:

10.	11.	12.
21.204 by 190	35.53 by 170	40.00 by 240
36.04 by 20	62.004 by 30	31.80 by 1,060
25.032 by 300	20.40 by 800	1.500 by 450
.081 by 90	39.20 by 2,800	8,400 by 6,300

13. Lafayette entered the American army in 1777. How many years ago was that?

1. A man having 500 bu. of wheat sold 8% of it. How many bushels did he sell?

2. Mr. Brown's expenses were $75.75 in January, $80.38 in February, $72.62 in March, $84 in April. What were his average expenses a month? At the same average for a year what would be his expenses?

3. Change these decimals to common fractions and add them:
.5, .75, .625, .80, .05, .20.

4. Divide 846.15 by 4.5.

5. Divide 723.45 by 10; by 100; by 1,000.

6. Multiply 72.345 by 10; by 100; by 1,000.

7. A man bought a load of hay for $18.75, another for $13.25. He sold the two loads for $35.

8. Mr. H. bought 5 houses. The first cost $4,357.25; the second $1,307.50; the third $3,800; the fourth $4,682.75; the fifth $2,000. Find the average cost.

9. How many barrels of flour at $5½ a barrel can be bought for $165?

10. If a train of cars can run 496⅔ miles in 12 hours, how many miles can it run in 1 hour?

NOTE. — Do not change to fifths before dividing.

11. Last month a man earned $121. This was 1⅒ of what he earned the month before. How much did he earn during both months?

12. How many cords of wood in a pile 60 ft. long, 4 ft. wide, and 8 ft. high? What is it worth at $5.25 a cord?

13. Jones lost $400, and had ⅝ of his money remaining.

14. ¾ of a ship is worth $27,000. What is the value of ⅞ of it?

15. It cost a man $1,770 to build ¾ of his house. At the same rate what would it cost to build 5 houses?

16. Find the square feet in the following rectangles:

12 ft. by 15 ft.	19 ft. by 23 ft.	18 ft. by 16 ft.
14 ft. by 17 ft.	11 ft. by 15 ft.	15½ ft. by 12 ft.

ORAL.

1. How many square inches in a square that is —— inches on a side? How many square inches in a square that is —— inches more on a side? How many square inches in both squares?

2. I bought —— ounces of candy; what part of a pound did I buy?

3. What number is —— more than ——?

4. A bin held —— bushels of potatoes, how many pecks were there?

5. A rectangle is —— inches wide, and twice as long as wide. What is its perimeter?

6. I have —— apples, and my brother has ——. How many must I give my brother that we may have the same number?

7. A book and a picture cost $——. If the book cost $——, what did the picture cost?

8. Find —— per cent of ——.

9. Find —— per cent of ——.

10. If I use —— sheets of paper, what per cent of a quire do I use?

11. If I buy shoes for $—— a pair, and sell them for $—— a pair, what per cent do I gain?

12. If a man buys a watch for $——, and sells it for $——, what per cent does he lose?

13. If you buy a knife for ——, for how much must you sell it to gain —— %?

14. Add:

$4\frac{1}{2}$	$5\frac{1}{3}$	$7\frac{1}{3}$	$7\frac{1}{6}$	$9\frac{1}{2}$	$6\frac{1}{6}$
$3\frac{1}{4}$	$3\frac{1}{4}$	$9\frac{1}{6}$	$8\frac{1}{12}$	$8\frac{1}{6}$	$4\frac{1}{12}$

15.

$\frac{1}{2}+\frac{1}{4}=\frac{}{4}$?	$\frac{1}{2}+\frac{1}{8}=\frac{}{8}$?	$\frac{1}{2}+\frac{1}{3}=\frac{}{6}$?
$\frac{1}{2}+\frac{1}{6}=\frac{}{6}$?	$\frac{1}{2}+\frac{1}{5}=\frac{}{10}$?	$\frac{1}{2}+\frac{1}{7}=\frac{}{14}$?
$\frac{1}{2}+\frac{1}{9}=\frac{}{18}$?	$\frac{1}{3}+\frac{1}{2}=\frac{}{6}$?	$\frac{1}{3}+\frac{1}{4}=\frac{}{12}$?
$\frac{1}{3}+\frac{1}{5}=\frac{}{15}$?	$\frac{1}{3}+\frac{1}{6}=\frac{}{6}$?	$\frac{1}{3}-\frac{1}{7}=\frac{}{21}$?

Holyoke, Feb. 1, 1898.

JOHN JAMES,

Bought of N. Y. FURNITURE CO.

Jan.	*25*	*36 yd. Ingrain Carpeting, @ 85¢,*	*$30*	*60*		
"	*25*	*48 yd. Brussels Carpeting, @ $2.80,*	*134*	*40*		
"	*25*	*1 Chamber Set,*	*75*	*00*		
"	*25*	*1 Parlor Set,*	*175*	*00*	*415*	*00*
		Received payment,				
		N. Y. Furniture	*Co.*			
			Per	*Smith.*		

1. In the above bill who bought the goods? Who sold them?

2. When and where was the bill made out? When were the articles bought?

3. Has the bill been paid? Who must sign it, or receipt it? What was the name of the book-keeper who receipted the bill for the company?

4. Read the first item of the account. What was bought? How many yards? What was the price per yard? What does @ stand for? Does the $.85 following the @ mean the price of *all* or the price of *one?* What was the whole cost of the first item?

5. Answer the same questions for each of the following items of the bill.

6. Notice carefully where every part of each item is placed.

7. Make out a bill and receipt it when M. H. Merron buys of J. D. Moore, 1 bag meal, $1.76; 15 lb. gran. sugar, @ 7¢; 3 lb. raisins, @ 22¢; 3 gal. molasses, @ 67½¢; 4 lb. tea, @ $1.25.

8. When anyone buys goods of another, the one who buys or receives the goods is called the debtor (Dr.), and the one of whom the goods are bought is called the creditor (Cr.). Name the debtor and creditor in the examples in this bill.

Holyoke, Feb. 1, 1898.

JOHN JAMES,

To the N. Y. FURNITURE CO., *Dr.*

Jan.	*25*	*To 36 yd. Ingrain Carpeting @ $.85,*	*30*	*60*		
"	*25*	*To 48 yd. Brussels Carpeting @ $2.80,*	*134*	*40*		
"	*25*	*To 1 Chamber Set,*	*75*	*00*		
"	*25*	*To 1 Parlor Set,*	*175*	*00*	*415*	*00*
		Received payment,				
		N. Y. Furniture Co.				
			Per	*Smith.*		

1. How does the heading of this bill differ from that in Lesson 26?

2. With what word does each item begin when this form is used?

Use this form in the examples in this lesson, and make out bills.

3. Mr. Lyman Smith, on Nov. 1, 1898, bought of Smith and Howard, 50 lb. coffee sugar @ 6¢; 10 lb. Java coffee @ 35¢; 4 lb. oatmeal @ 5 ct.; 8 doz. eggs @ 20¢; 4 gal. molasses @ 70¢; 50 lb. butter @ 25¢; 2 doz. lemons @ 25¢.

4. John Osgood, on Aug. 2, 1898, bought of R. H. Macy, 6 bbl. pork @ $22.00; 431 lb. ham @ 17¢; 286 lb. beef @ 10¢; 362 lb. bacon @ 11¢; 18 bu. beans @ $2.00.

5. June, 1898, Chas. Brewer sold H. E. Tucker 10 bbl. rye flour @ $6.00; 40 bbl. St. Louis flour @ $7.00, 100 bu. corn @ $1.00; 100 bu. wheat @ $0.90.

6. June 14, 1898, J. H. Conner sold to W. T. Collins, 80 bu. yellow corn @ 80¢; 100 bu. rye @ $0.60; 200 bu. oats @ 35¢; 10 bbl. rye flour @ $6.00.

7. May 3, 1898, Chas. O. Ramsey sold to W. A. Bailey, 1 book-case, $29.00; 1 cottage bedstead, $4.50; 1 black walnut extension table, $19.00; 24 yd. stair carpeting @ 62¢; 1 hall mat, $3.50; 25 yd. Brussels carpeting @ $1.25.

Write the following bills, using either form:

1. May 17, 1898. Geo. W. Howe, Cr. J. O. Hancock, Dr. 8 yd. crash @ 20¢; 1 table-cover, $1.20; 40 gal. molasses @ 62¢; 4 gal. linseed oil @ $1.00; 25 lb. lead @ 13¢; 50 lb. of dried apples @ 13¢.

2. James L. Davis bought on May 10, 1898, of Benj. B. Webb, 1 bbl. flour, $6.50; 8 bu. meal @ 90¢; 1 bbl. sugar (196 lb.) @ 8¢; 28 gal. molasses @ 62¢; 4 bu. potatoes @ 60¢; 10 bu. of corn @ 75¢.

3. Fred Williams bought of J. Jackson & Co., Apr. 6, 1898, 2 pairs boy's boots @ $5.00; 1 pair ladies' kid boots @ $4.00; 1 pair rubber boots @ $4.00.

4. Joseph Hanson sold Samuel Bennett, on April 23, 1898, 2 cd. pine wood @ $3.00, 245 ft. lumber @ $3.25 per C.; 75 cd. hard wood @ $5.75.

5. April 21, 1898, John M. Flanders bought of Henry O. Turner 1 blank book, 30¢; 1 arithmetic, $1.25; 1 slate, 31¢; 4 quires paper @ 15¢; 19 yd. border @ 5¢.

6. Fred Bruce bought of H. W. Longley, Mar. 4, 1898, ½ bu. of apples @ 60¢; 2 bu. potatoes @ 63¢; 6 lb. butter @ 35¢; ½ bu. onions, 45¢; 4 cabbages @ 5¢; 3 lb. honey @ 32¢.

7. Mrs. James Shelds bought of Henry Morse on April 15, 24 yd. cloth @ $3.80; 15 yd. velvet @ $4.50; and on May 10, 48 yards silk @ $3.50; 27 yd. cassimere @ $1.36. Send her bill on June 1.

8. Make out the following bill, supplying names and date: 3¾ lb. tea @ 60¢; 200 lb. sugar @ 4¼¢; 45 yd. print @ 9⅓¢; 33 lb. cheese @ 15¢.

9. Make out a bill against your teacher that shall include five items of goods bought at a grocery store. Also one of goods bought at a market.

10. Make out a bill against a classmate of five items of goods bought at a dry-goods store.

1. Make out the following bill: Robert J. Wilder bought of J. H. Smith 64 lb. sugar @ 4½¢, 25 lb. lard @ 6½¢, 34 lb. coffee @ 33¢, 1 bbl. flour, $5.75, 14 gal. molasses @ 22½¢.

2. Find the sum of $7\frac{1}{2}$, $8\frac{3}{5}$, $9\frac{3}{4}$, $7\frac{5}{8}$, $8\frac{7}{8}$.

3. What will 78 acres of land cost if 13 acres cost $1,625?

4. Divide $1\frac{5}{8}$ by 15.

5. Add 7.85, 46.068, 9.8, .875, 78.94, 6.59.

6. How many square feet are there in the walls and ceiling of a room 17 ft. long, 14 ft. wide, and 10 ft. high?

7. Find the number of cubic feet of air in a room 14 ft. long, 11 ft. wide, and 9 ft. high.

8. 128 is $\frac{4}{5}$ of what number?

9. Divide 31.5 by .126.

10. Multiply .078 by .0009.

11. If 18 men can do a piece of work in 42 days, how long will it take 21 men to do the same work?

12. What is the cost of 64 sheep, if 18 cost $198?

13. $\frac{7}{8}$ of an acre of land is sold for $140. What is the price of an acre?

14. At 50¢ a square yard, what is the cost of carpet to cover a floor 18 ft. long and 15 ft. wide?

15. Find the number of square inches in one pane of glass in the schoolroom window. In all the panes in one window. In all the panes in all the windows.

16. Bought 5 bu. of apples at 62½¢ a bushel, and sold them at 12½¢ a peck.

17. If a milk can holds 14 gal. 3 qt. 1 pt. of milk, how many pints does it hold when full?

18. Subtract:

$64\frac{1}{2}$	$99\frac{1}{3}$	$87\frac{1}{2}$	$15\frac{1}{2}$	$20\frac{1}{2}$
$5\frac{1}{6}$	$27\frac{1}{6}$	$49\frac{1}{3}$	$8\frac{1}{4}$	$11\frac{1}{8}$

19. Subtract:

$13\frac{1}{3}$	$81\frac{1}{4}$	$93\frac{1}{4}$	$47\frac{2}{3}$	$68\frac{4}{5}$
$5\frac{1}{4}$	$36\frac{1}{8}$	$83\frac{1}{6}$	$23\frac{1}{3}$	$47\frac{1}{2}$

ORAL.

1. If $\frac{5}{7}$ of a barrel of oil cost $36, what will $\frac{4}{5}$ of a barrel cost?

2. If 80 cents are paid for $\frac{4}{5}$ of a basket of peaches, what is the cost of $\frac{1}{2}$ of a basket?

3. I sold a horse for $48, which was $\frac{8}{9}$ of what he cost me. What did he cost me?

4. George sold a kite for $\frac{3}{4}$ of what he paid for it, and lost 8 cents.

5. 8 is $\frac{2}{5}$ of what number?

6. The difference between $\frac{1}{3}$ and $\frac{2}{10}$ of a number is 5. What is the number?

7. Change to fractions having smaller terms: $\frac{18}{30}$, $\frac{12}{28}$, $\frac{9}{27}$, $\frac{21}{24}$, $\frac{20}{36}$, $\frac{12}{24}$, $\frac{16}{36}$, $\frac{24}{40}$, $\frac{14}{42}$, $\frac{40}{48}$, $\frac{20}{50}$, $\frac{36}{60}$.

8. If 6 yd. of muslin cost 60 cents, what will 2 yd. cost? 3 yd.? 12 yd.?

9. Carl picks berries, and sells them at 9¢ a quart. How many quarts must he sell to earn enough to buy a hat worth 70 cents, and a slate worth 11 cents?

10. How far will a man travel in 48 days, if he travels 30 miles in 4 days?

11. What is the relation of 32 to 4? Of 27 to 9?

12. Sold a cow for $24, which was $\frac{8}{9}$ of the cost of the cow.

13. If 6 men build 10 rd. of wall in a given time, how many rods can 54 men build in the same time?

14. If $\frac{3}{4}$ of 48 oranges cost 40 cents, what will $\frac{3}{4}$ of 12 oranges cost?

15. A watch cost $30, and $\frac{4}{5}$ of its cost is twice the cost of the chain.

16. What is the value of 3 bu. of peaches at the rate of $2 for $\frac{3}{4}$ of a bushel?

17. A coal dealer had 50 tons of coal. He burned 30 tons; what is the remainder worth at $4 a ton?

1. Write bills for the following sales, supplying names and dates. Receipt them. 12 bbl. flour @ \$6.25; 160 bu. wheat @ \$.83; 80 bu. corn @ \$.75; 186 doz. eggs @ 18¢; 146 lb. beef @ 12½¢.

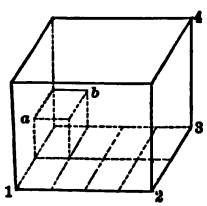
2. 24 yd. muslin @ 9¢; 8 yd. ribbon @ 42¢; 3 doz. buttons @ \$.25; 12 yd. silk @ \$1.25.

3. The following is the weekly time sheet and daily wages of the employees of a mill. Find their week's wages, 10 hours constituting a day's work.

	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Wages.
Chas. Cowles	9½	8	7½	10½	10	6½	\$1.50
J. Brown	8½	4	10	9½	8¾	6	1.70
Henry Hall	4¼	6½	8¼	10	10½	9	1.20
C. Hyde	6¾	7½	8¼	9¾	10	8¼	1.80
J. Smith	7½	10½	2½	7	6	9	2.00

4. Make out a similar time sheet, supplying all items.

5. How many cubic inches in a box 4 in. long, 2 in. wide, and 3 in. high? Make a drawing that will represent the number of inch cubes in one row of the bottom layer.



1–2 represents the length of the box, 2–3 the width, 3–4 the height. *a–b* represents one block in the lower layer. Can you see how many blocks there would be in a row? In a layer?

6. Make similar illustrations to show the number of cubic inches in a box 8 in. long, 6 in. wide, and 4 in. high.

7. Also for a box 6 in. long, 6 in. wide, and 6 in. high.

8. Using scale 1 in. to a foot, illustrate cubic feet in a box 9 ft. long, 7 ft. wide, and 5 ft. high.

9. Using same scale illustrate the surface of this box.

Note. — See Lesson 3, Grade IV.

ORAL.

1. What per cent is gained by selling a plough for $10 which cost $8?

2. 20% of a number is 40. What is the number?

3. 60 lb. is 6% of how many pounds?

4. $24 is 8% of how many dollars? $36 is 12% of how many?

5. How many times are .3 contained in .15? .4 in .8? .6 in 1.2? .9 in 2.7?

6. How many times are .03 contained in .06? .04 in .08? .06 in .12? .09 in .27?

7. Divide .006 by .002. .018 by .003. .024 by .012. 1.44 by .12. .144 by .012.

8. If 5 men can do a piece of work in $\frac{6}{10}$ of a week, in what time can 1 man do it?

9. If 4 men can do a piece of work in $\frac{3}{4}$ of a week, in what time can 1 man do it?

10. If $\frac{2}{3}$ of a box of raisins is worth $4, what is 1 box worth? How many apples at $2 a bushel will pay for the box?

11. $8\frac{1}{3}$ is $\frac{5}{7}$ of what number?

12. Give answers:

$\frac{1}{3} - \frac{1}{4}$ $\quad \frac{3}{4} - \frac{1}{4}$ $\quad \frac{3}{4} - \frac{2}{3}$ $\quad \frac{1}{4} - \frac{1}{5}$ $\quad \frac{1}{5} - \frac{1}{6}$

$\frac{2}{3} - \frac{1}{2}$ $\quad \frac{1}{7} - \frac{1}{8}$ $\quad \frac{2}{7} - \frac{1}{8}$ $\quad \frac{1}{8} - \frac{1}{9}$ $\quad \frac{2}{9} - \frac{1}{3}$

How many cubic inches in a rectangular solid:

13. 6 in. long, 5 in. wide, and 3 in. thick?

14. In a solid 4 in. long, 2 in. wide, and 7 in. thick?

15. In a solid 12 in. long, 12 in. wide, 12 in. thick?

16. In a cube 3 in. long, 3 in. wide, and 3 in. thick?

17. At what price must books that cost $4 each be sold so as to gain 50%? 25%? 10%?

18. George has 15 cents, which is 5% of what William has. How many cents has William?

19. What is 4% of 300? 500? 1000?

1. Multiply 184 by $7\frac{3}{4}$.

2. How many square feet of boards will be required to board and roof a house 45 ft. long, 36 ft. wide, with 24 ft. posts, the pitch being $\frac{1}{3}$, and the rafters 22 ft.?

3. A man bought 25,460 lb. of cotton at 8¢ a pound. A fire destroyed $\frac{1}{4}$ of it. He sold the rest of it at 11¢ a pound.

4. At $\$3\frac{1}{2}$ a rod what will it cost to fence a rectangular lot 74 rods by 68 rods?

5. Add: $\frac{5}{7} + \frac{1}{2}\frac{1}{4} + \frac{2}{3} + \frac{5}{9}$.

6. Bought cloth for $\$58\frac{3}{8}$, and sold it for $\$49\frac{3}{4}$.

7. A farmer raised 185 bu. of corn this year, twice as many last year, and the year before last twice as many as last year and this year together. How many bushels did he raise the year before last?

8. $50\frac{3}{8} - 23\frac{5}{9}$.

9. Change 4 bu. 2 pk. 7 qt. to quarts.

10. $\frac{1}{3}$ of one number is 639, and 6 times another number is 612. Find the sum of the two numbers.

11. Find the number of square inches in a piece of paper 7 ft. long and 9 inches wide.

12. How many inch cubes can be put into a box 28 in. long, 17 in. wide, and 13 in. deep?

13. A man sold a horse for $233, and gained $35.50.

14. 128 is $\frac{4}{5}$ of what number?

15. 581 is $\frac{7}{8}$ of what number?

16. A man paid $465 for a span of horses, and $185 less for carriage. Find the cost of both.

17. How many dozen are there in 45 score?

18. Change 28 yd. 2 ft. 7 in. to inches.

19. Change 435 gills to higher denominations.

20. $958 + (144 \div 12) \times 9 - (\overline{18 - 3} \times 6 + 64 - \overline{53 + 48})$.

21. Find the value of a pile of bark 140 ft. long, 36 ft. wide, and 16 ft. high at $2.45 a cord.

1. Rule paper and fill out bill for 12 bu. corn @ 65¢; 25 bbl. flour @ $5.25; 16 bu. wheat @ $1.12; 23 bu. rye @ 83¢.

2. Find 16% of $413.50. Of $469.47.

3. Find 65% of 34,821. Of 3,047.2.

4. If you had $1,560 in a bank, and should draw out 35% of it, how much would remain in the bank?

5. A farmer raised 1,860 bu. of potatoes. He sold 60% of them at 65¢ a bushel, and the remainder at 85¢ a bushel.

6. I buy oranges at 18¢ a dozen, and sell them at the rate of 3 for 6 cents. What is my profit on a dozen oranges? On 120 oranges?

7. What will it cost to pave a cellar 16 ft. 6 in. long by 12 ft. wide, at 80¢ a square yard?

8. What is the area of a circle whose radius is $10\frac{1}{2}$ ft.?

9. A circular piece of land has a diameter of 84.7 ft. What is its area?

10. How many square inches in the outside surface of a box 8 ft. long, 4 ft. 6 in. wide, and 2 ft. high?

11. A square pyramid has a base of 10 ft., and a slant height of 8.6 ft. Find the area of its entire surface.

12. A piece of land is 15 rd. 10 ft. long, and 165 ft. wide. What is it worth at 12¢ a square foot? What will it cost to fence it at 75¢ a yard?

Definitions to be memorized:

13. A Compound Number is a concrete number composed of simple numbers of different denominations. 3 yd. 1 ft. 9 in.

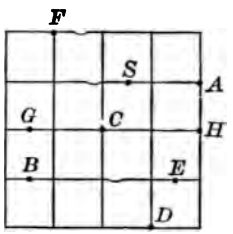
14. Commission is the charge made by an agent for transacting business.

15. Insurance is a contract by which a person whose property is insured receives security against loss in consideration of a sum of money paid to the insurance company.

The written contract is called the Policy.

The sum paid for insurance is called the Premium.

ORAL.



These lines represent streets in a city. Each square represents a block. *S* represents the position of the schoolhouse. The other letters represent the homes of different pupils. Scale ¼ inch for 40 rods.

1. Find how many rods A must travel to go to school. What part of a mile?
2. How many rods would B travel? What part of a mile?
3. Answer the same questions for C, D, E, F, G, H.
4. How far would A travel if he called for E?
5. How far would B travel if he called for D?
6. How far would C travel if he called for G?
7. How far would D travel if he called for B?
8. How far would E travel if he called for H?
9. How far would F travel if he called for G?
10. How far would G travel if he called for B?
11. How far would H travel if he called for D?
12. If it takes 16 min. to walk a mile, how long will it take each pupil to go direct to school?
13. How long, when they call for their friends, as indicated in questions 4 to 12?
14. If A can ride his bicycle a mile in 10 min., how long will it take him to take this trip: From his house past H, C, E, G, and the schoolhouse to his home?
15. Riding at the same speed, how long will it take F, starting from his home, to go past the homes of G, B, D, E, H, and A to his home?
16. At the same rate, how long will it take G, starting from his home, to go to D's home on an errand, back home, and then to school?
17. How long will it take D to make the circuit of the square?

INTEREST.

1. If I use another's house, what is the money I pay for the use of it called?

2. If I use a man's horse, what is the money I pay for the use of it called?

3. If I use another's money, what is the money I pay for the use of it called? Interest.

4. What is interest?

NOTE. — Interest differs from house-rent in that it is always a certain per cent of the money borrowed.

5. I asked a man to lend me some money. He said he would at 6%. What did he mean?

6. If I borrowed $1 of him, and kept it one year, how much interest ought I to pay him?

7. When one man borrows money of another, he usually gives him a paper called a promissory note, to prove that he has borrowed money.

$100 *Holyoke, Nov. 5, 1898.*

On demand, I promise to pay to John Smith, or order, One Hundred Dollars, with interest at 6%.

Value received. *Geo. Whittaker.*

8. In this note who promises to pay? To whom does he promise to pay? How much does he promise to pay?

9. The one who promises to pay is called the promisor or maker. The one to whom the promise is made is called the promisee or payee. The sum of money is called the face. Name the maker, payee, and face in this note.

10. When the words "on demand" are in the note, the payee can demand the payment of the money at any time. When the words "or order" are in the note, the payee can order the money paid to some one besides himself.

11. Write a demand note, using the following: date, to-day; maker, yourself; payee, your teacher; face, any sum.

INTEREST.

1. Sometimes the words "on demand" are not in the note, but in their place a certain specified time. The following is a time note:

$100 *Holyoke, Nov. 5, 1898.*

Six months after date I promise to pay John Smith, or order, One Hundred Dollars, with interest at 6%. Value received.

Geo. Whittaker.

2. If I must pay 6 cents for the use of $1 for 1 year, what part of the year can I keep the dollar and pay only 1 cent interest? How many months is $\frac{1}{6}$ of the year?

3. Then what is the interest of $1 for 2 mo.?

4. If the interest of $1 for 2 mo. is .01, what will be the interest of $5? $8? $10? $100?

5. If the interest of $1 is .01 for 2 mo., the interest of $100 will be 100 times $.01, which is $1.00. What short method can you see for multiplying .01 by any number?

6. Give a rule for finding the interest on any sum of money for 2 mo. at 6%.

7. Why does pointing off two places give the interest for 2 mo.?

Find the interest on the following sums of money for 2 mo. at 6%:

8.	$60	$ 88	$305	$543	$5,678
9.	30	72	475	842	4,978
10.	48	46	267	643	9,876
11.	39	83	394	500	4,743
12.	62	450	412	402	3,649
13.	79	276	516	819	6,891
14.	12	118	618	549	4,206
15.	24	374	728	675	2,060
16.	31	333	175	715	1,008

INTEREST.

NOTE. — In all examples in Interest in this book 6% is understood.

1. Find the interest of $500 for 6 mo.

$5.00 = int. for 2 mo.
3
$15.00 = int. for 6 mo.

First find the interest for 2 mo. by pointing off two places; this is $5. If $5 is the interest for 2 mo., the interest for 6 mo. will be 3 times as much.

2. How would you find the interest for 4 mo.? 8 mo.? 10 mo.? 1 year (12 mo.)? 1 yr. 4 mo. (16 mo.)?

3. Take the sums of money in Lesson 37, and find the interest on each for 4 mo. 6 mo. 8 mo. 10 mo. 1 year.

4. Find the interest of $600 for 10 mo.

5. Find the interest for 6 mo. on $1,200. On $2,400.

6. Find the interest for 1 year on $750. On $300. On $250.

7. Find the interest for 1 yr. 2 mo. on $405. On $145. On $69.

8. Find the interest for 1 yr. 8 mo. on $1,216. On $2,445.

9. On $1,218 for 1 yr. 10 mo.

10. On $600 for 1 yr. 4 mo.

11. On $436 for 8 mo.

12. Find the interest of $800 for 9 mo.

$ 8.00 = 2 mo.
$32.00 = 8 mo.
4.00 = 1 mo.
$36.00 = 9 mo.

First find for 8 mo. as usual. Then for the odd month, which must be ½ of the interest for 2 months.

13. Find the interest on $900 for 9 mo.

14. On $1,200 for 7 mo. (6 mo. + 1 mo.)

15. On $2,200 for 1 yr. 3 mo. (14 mo. + 1 mo.)

16. On $3,460 for 1 yr. 5 mo. (16 mo. + 1 mo.).

17. On $489 for 1 yr. 2 mo. For 9 mo.

18. On $638 for 1 yr. 7 mo. (18 mo. + 1 mo.).

19. On $1,240 for 11 mo. For 1 yr. 5 mo.

20. On $9,876 for 5 mo. For 1 yr. 3 mo.

21. On $4,675 for 3 mo. For 1 yr. 2 mo.

1. Find the interest of $265 for 1 yr. 7 mo. at 6%.

2. A dealer bought 50 buffalo robes at $8 each, and sold them at 16% loss.

3. What is the worth of a pile of wood 48 ft. long, 6 ft. high, and 4 ft. wide, at $4¼ a cord?

4. A rectangular flower garden is 30 yd. long and 18 yd. wide. What is its area?

5. In 1,560 ft. how many rods?

6. How many gills in 6 gal. 1 qt. 1 pt. 3 gills?

7. How many rods of fence are required on both sides of a road 2 miles long?

8. Hon. John Jenks bought of Horace Parsons 7 lb. coffee @ 38¢; 12 lb. sugar @ 6¢; 6 lb. corn starch @ 11¢; 5 lb. tea @ 87¢. Make out a bill and receipt it.

9. A house is 80 ft. long, 40 ft. wide, and has 20 ft. posts. The roof has a ¼ pitch, and the rafters are 22 ft. long. Find the square feet of lumber needed to board and roof it.

10. How many tubs of butter, at $16.50 each, can be bought for $206.25?

11. How long will 150 lb. butter last a family if they use 3½ lb. a week?

12. A lady paid $62 for 15½ yd. of silk. What was the silk a yard?

13. A drover paid $18¼ for 5 sheep. How much was that a head?

14. A dealer exchanged 88 pairs of shoes at $2, and 110 pairs of boots at $9 a pair for coal at $5.50 a ton. How many tons did he receive?

15. Make out a bill that shall include six items of articles bought of your grocer.

16. Suppose you were working in a shoe-store, and your teacher bought of you a pair of shoes, a pair of rubbers, and a pair of slippers; make out her bill.

ORAL.

1. What part is gained by buying a horse for $400, and selling it for $500? What per cent is gained?

2. For what sum would the horse be sold to lose 25%?

3. At 33⅓¢ a square foot, what will a square yard of anything cost?

4. What part does a merchant make by selling his goods for ⅘ of their cost? What per cent does he make?

5. Two boys do a piece of work for $6. If each boy does the same amount of work, how ought the money to be divided?

6. What is the interest of $200 for 2 years?

7. A merchant sold for $200 goods that cost him $160. What per cent did he gain?

8. Find the cost of 7 doz. pencils at $4.80 a gross.

9. How far can a ship sail in ⅘ of a day at the rate of 6 miles an hour?

10. What part of a 4-foot square is a 2-foot square?

11. Find the cost of 15 oranges if 5 oranges cost 12 cents?

12. Of what number is 16 8%?

13. Of what number is 21 33⅓%?

14. If you miss 8 words out of 24, what per cent do you spell correctly?

15. What per cent of profit do I make when I buy for $4, and sell for $6?

16. Find the gain when coal costing $4.50 a ton is sold at a gain of 10%. From the cost and gain, what can you find?

17. If the cost of ⅔ of a yard of silk is 60 cents, what is the cost of a yard?

18. How many cents in ¼ of a dollar?

19. When muslin costs 8¢ a yard, what part of a yard can be bought for 2 cents? 4 cents? 6 cents?

20. How many days will 21 lb. of butter last, if ½ lb. is used each day? How many weeks?

1. What per cent did I lose by selling a buggy for $150 that cost me $180?

2. If some books cost me $.40 each, what per cent did I lose by selling them at $4.50 a dozen?

3. Write a promissory note, with yourself as the maker, and a classmate the payee, $500 the face.

4. Find the interest of $425 for 1 yr. 4 mo. at 6%.

5. At $6 a cord, what is the value of 2 piles of wood 20 ft. long, 4 ft. wide, and 10 ft. high?

6. What is the area of a rectangle 20 in. long and 15 in. wide?

7. A rectangular walk contains 225 square feet; its length is 25 ft. What is its width?

8. What is the area of a walk 25 ft. long and 9 ft. wide?

9. What is 75% of 844? What is .75 of 844? What is $\frac{75}{100}$ of 844?

10. $125 is .25 of what sum? It is 25% of what sum?

11. A house is 36 ft. wide and 52 ft. long, and has 18 ft. posts. The roof has a $\frac{1}{4}$ pitch, and the rafters are 21 ft. long. Find the square feet of boards needed to cover its entire surface.

12. What is the price of one ream of paper when 19 reams cost $8.55?

13. What is the price of 1 cord of wood when 3.75 cd. cost $18.75?

14. $18\frac{1}{8} - 2\frac{1}{10}$. $16\frac{1}{8} - 5\frac{3}{4}$. $129\frac{1}{3} - 85\frac{7}{12}$.

15. The owner of $\frac{5}{6}$ of a mill sold $\frac{1}{8}$ of the mill to one man, and $\frac{1}{3}$ to another. What part did he still own?

16. $72 \times \frac{5}{8}$. $36 \times 1\frac{1}{4}\frac{5}{8}$. $\frac{1}{2}\frac{3}{4} \times 40$.

17. Find the cost of 125 gal. @ $.37$\frac{1}{2}$.

18. Find the cost of $18\frac{3}{4}$ bu. @ $.65.

19. If your father owned $\frac{1}{3}$ of a factory worth $30,000, and sold $\frac{1}{8}$ of it, what part would he then own? and what would it be worth?

ORAL.

1. What is the interest of $50 for 1 yr.?

2. What is the interest of $200 for 5 mo.?

3. If 8 bbl. of flour cost $40, what will 5 bbl. cost?

4. If 10 bbl. of flour cost $60, what will 12 bbl. cost?

5. If 12 men can build 48 rods of wall in a day, how many rods can 20 men build in the same time?

6. If 7 acres of land are worth $50, what will 14 acres cost?

7. If 56 is divided by 7, the quotient multiplied by 8, the product diminished by 14, the remainder divided by 5, the quotient increased by 12, the sum diminished by 7, the remainder multiplied by 4, what is the result?

8. The area of a rectangular grass plot is 108 square yards. If its breadth is 9 ft., what is its length?

9. The contents of a box is 24 cubic inches. If it is 4 in. long, 3 in. wide, how high is it?

10. A man bought a cow. He paid $30 down, and agreed to pay the balance in two installments of $14 each. What was the price of the cow?

11. A boy paid 75 cents for a knife, and sold it at a loss of $33\frac{1}{3}\%$. How much did he lose?

12. If I collect a bill of $300, and keep $16\frac{2}{3}\%$ for my work, how much do I keep? What is the money that an agent keeps called?

13. A grocer paid $30 on a bill of goods. If this is 25% of the whole bill, what is the bill?

14. A man paid $200 for a carriage, and sold it at a loss of 25%. For what did he sell it?

15. A man bought a suit of clothes, and paid $15, which was $\frac{1}{3}$ the price. The next day he paid $\frac{1}{3}$ of it. How much has he paid? How much does he still owe?

16. How much rent do I pay in a year if $\frac{1}{4}$ of a month's rent is $5?

1. If 9 hours constitute a day's work and $1.50 a day's pay, find the week's wages of the following:—

	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
A	5½ hr.	8 hr.	9 hr.	7 hr.	4 hr.	6 hr.
B	7½	9½	4½	0	7½	6¾
C	8	9	8½	6	7½	9
D	9	8½	9	5½	8	9
E	9	7½	6	9	6½	9

2. Find the interest on $1,464 for 1 yr. 6 mo. at 6%

3. Mrs. John Bell bought of Chas. Brown & Co., on Aug. 20, the following:— 35 yd. silk @ $1.35; 5 yd. lining @ $.13; 3½ yd. lining @ 22¢; 6 yd. muslin @ 9¢; 3 doz. buttons @ 32¢; 11 yd. cotton @ 11¢; 7 yd. flannel @ 36¢; 1 pair kid gloves @ $1.50; 6½ yd. ribbon @ 38¢; 2 silk handkerchiefs @ $1.12½; 8½ yd. embroidery @ 25¢. Make out an itemized bill.

4. Most business houses render a monthly statement.

The following is the form of the above account to be rendered every month after the first one.

Holyoke, Oct. 1, 1898.

Mrs. John Bell,

To Chas. Brown & Co., *Dr.*

	To acct. rendered,		*$62*	*25*	

5. How does this monthly statement differ from the bill you have made?

6. Express in words, .054; .0006; 4.0002; 3.001.

7. At $6.50 a hundred, how many pounds of beef cost $45.50?

8. Find the value of 645 lb. of hay at $18 a ton.

9. At 35¢ a peck, how many bushels of potatoes can be bought for $119.00?

In Lesson 43 you were shown the form of a monthly statement. Sometimes after bills have been rendered, part of the money is paid, and other articles purchased. This demands a little different form. Suppose that Mrs. Bell, on Oct. 10, should buy 12 yd. of cloth @ $1.75, and 5 yd. @ $1.50, and that on Oct. 15 she should pay $40.50. The following statement and bill would be sent on Nov. 1:

Holyoke, Nov. 1, 1898.

MRS. JOHN BELL,

To CHAS. BROWN & CO., *Dr.*

		To acct. rendered,			$62	25
Oct.	*10*	*To 12 yd. cloth @ $1.75,*	$21	00		
"	*10*	" *5 yd. cloth @ $1.50,*	7	50	28	50
		Credit,			$90	75
Oct.	*15*	*By cash,*			40	50
		To balance,			$50	25

1. If there were no further transactions, make out a monthly statement for Dec. 1, 1898.

2. Transactions: Dec. 3, 1898, Frank Keith bought of the Holyoke Lumber Co. 1,350 ft. pine lumber @ $32.50 per M.; 4,750 ft. spruce @ $26.75 per M.; 4,125 cedar @ $8.75 per C. On Dec. 21 he bought 6,500 shingles @ $4.75 per M.; 16,450 pickets @ $7.70 per M. On Jan. 5 he paid $150. On Jan. 15 he paid $145. Feb. 10, he paid the balance in full.

a. Render an itemized bill Jan. 1, 1899.

b. Render a credit statement of his account on Jan. 5, 1899.

c. Render another statement when he makes his next payment, Jan. 15.

d. Render a monthly statement for Feb. 1, 1899.

e. Make a statement and receipt it in full on Feb. 10.

3. As clerk for Chas. Brown write a letter to Mrs. Bell inclosing a statement for Dec. 1, 1898, and asking for immediate payment.

4. As Mrs. Bell write an answer, inclosing a payment of $25

ORAL.

1. Fred paid 12 cents for a knife, and sold it for 9 cents. What per cent did he lose? What is given? What is asked for?

2. George had 8 apples, and gave 50% of them to Mary. What is given and what required in this example?

3. Thomas has 6 cents, which is 50% of what his brother William has. How many has William? What is given and what required in this example?

4. Jennie had 15 cents when she went to the store, and 10 cents when she returned. What per cent of her money did she leave at the store? What is given and what required in this example?

5. B has $36, and pays 33⅓% of it for a coat. What does the coat cost him?

6. I buy goods for $10, and sell them for $15. What per cent do I gain?

7. A farmer had 16 bu. of corn, and sold 25% of it. How many bushels did he sell?

8. A man gave his son $12, which was equal to 25% of what he gave his daughter.

9. A man buys goods for $40, and sells them for $60. What is his gain per cent?

10. A lady had $66, and gave 33⅓% of it to Missions. How much did she give?

11. I buy a hat for 12 cents, and sell it for 14 cents. What per cent do I make?

12. I bought goods for $24, and sold them for $26. What per cent did I make?

13. A merchant bought a hat for $5, and sold it for $6. What per cent did he gain?

14. If I buy tea at 90 cents a pound, and sell it at $1.20 a pound, what per cent do I make?

1. Find the amount of money a farmer received if he sold the following: 105 bu. turnips @ 50¢; 111 bu. beets @ 80¢; 114 bu. parsnips @ 93¢; 215 bu. onions @ 98¢; 236 bu. tomatoes @ 42¢; 137 doz. cabbages @ 48¢.

2. Find the money he would have paid out if he bought at a market: 27 lb. pork @ 18¢; 32 lb. beef @ 12¢; 18 lb. mutton @ 14¢; 12 lb. veal @ 15¢; 18 lb. lamb at 17¢; 25 lb. ham @ 15¢.

3. Find the value of 7 piles of wood, each 248 ft. long, 4 ft. wide, and 12 ft. high, at $3.75 a cord.

4. How many blocks, each measuring one cubic inch, will it take to fill a mortise hole 12 in. long, 4 in. wide, and 6 in. deep?

5. How many square yards are there in the walls of a room 24 ft. long, 15 ft. wide, and 14 ft. high?

6. How many square rods in a rectangular garden 231 ft. long by 165 ft. wide?

7. Find the cost of 9,600 sheets of paper at $4.20 a ream.

8. How many half-pint bottles can be filled from a ten-gallon can of milk?

9. A man bought a house and lot for $6,835. He repaired the house at a cost of $1,250. The house was burned, and he received $3,575 insurance. He then sold the lot for $4,516. Did he gain or lose? and how much?

10. Find the interest on $5,618 for 1 yr. 10 mo. at 6%.

11. Cash on hand at the beginning of the day, $685.25. Received for cash sales during the day, $316.87. Paid out during the day, $137.95. What is the cash balance at the end of the day?

12. A merchant had on hand at the beginning of the year $1,468 worth of merchandise. He bought during the year $3,149 worth, and sold during the year $4,125 worth. On hand at the end of the year $1,125 worth. Find the gain or loss.

13. Find the area of a rectangle 5.8 ft. long by 4.6 ft. wide.

1. Mr. John Morris bought of Chas. Scott & Co., on Aug. 27, 1898, 25 lb. sugar @ 7¢; 11 lb. tea @ 45¢; 12 lb. coffee @ 36¢; 22 lb. raisins @ 12¢; 19 lb. currants @ 9¢; 17 lb. crackers @ 9¢. Make out a bill, and receipt it as clerk.

2. Divide 766,080 by 315. 701,153 by 211.

3. Multiply 3,548 by 368. 6,497 by 309.

4. A farmer has 7 lots, in each of which he pastures 9 cows. Each cow gives 12 qt. of milk a day. If he sells the milk at 6¢ a quart, how much does he receive in a week?

5. If 16 bu. of potatoes cost $10, how many bushels can be bought for $25?

6. If 8 lb. of wool are obtained from one sheep in a year, how much money will a man receive from a flock of 48 sheep, if wool is 33⅓¢ a pound?

7. What will it cost to paint the walls and ceiling of a room 36 ft. by 27 ft., and 12 ft. high, at $1.20 a square yard?

8. A farmer sold to a grocer 26 bu. of apples, at $1.25 a bushel, and took his pay in flour at $3.25 a barrel. How many barrels did he receive?

9. A farmer sold 2 loads of hay, one for $15¾, and the other for $18¾. If he received $28 in cash, how much is still due?

10. If 9½ tons of hay cost $95, how many tons can be bought for $108?

11. What is the value of three piles of wood, each 360 ft. long, 4 ft. wide, 6 ft. high, at $3.40 a cord?

12. Find the value of a piece of land 33 ft. by 40 rd., at $800 an acre.

13. A man bought a number of cows for $1,920. He sold them for $2,400. How much did he gain? If he gained $10 on each cow, how many cows were there?

14. Divide 8,763⅓ by 11.

15. If 56 men can do a piece of work in 21 days, how long will it take 24 men to do it?

1. The base of a triangular lot is 244 ft., and the altitude 108 ft. What is the area?

2. The diameter of a circle is 14 in. Find its area.

3. Find the interest of $785.75 for 7 months.

4. What is the surface of a right prism whose length is 20 in., and base a 6-in. square?

5. Out of a cask of sirup containing 96 gal., 32 gal. were drawn. What per cent was drawn?

6. What is 18% of $756.13?

7. A rectangular field is 40.4 rd. long and 30.5 rd. wide. What will it cost to build a wall round it at $1 a rod?

8. At $4.75 a cord, find the cost of a pile of wood 10 ft. long, 8 ft. high, and 4 ft. wide.

9. In New York, Mr. A. J. Palmer bought of John Fox & Co., 35 lb. crushed sugar @ 16¢; 25 lb. brown sugar @ 5¢; 12 lb. cheese @ 16¢; 18 lb. butter @ 23¢; 6 lb. raisins @ 13¢; 2 lb. crackers @ 8¢. Make out a bill.

10. A house is 28 ft. wide and 35 ft. long, and has 15-ft. posts. The roof has a ½ pitch, and the rafters are 17 ft. long. How many square feet of lumber are needed to roof and board it?

11. Paid $4,187.50 for a piece of land at $62.50 an acre.

12. What is the cost of 82.48 tons of coal at $6.25 a ton?

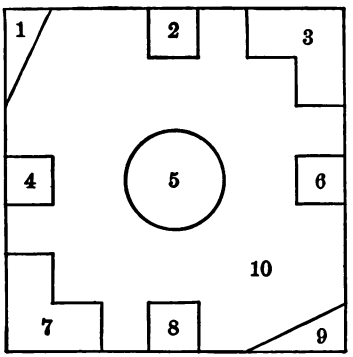
13. If 5 cords of wood cost $22.50, what will 3 cords cost?

14. If an acre of land costs $75, what will 17½ acres cost?

15. A man deposited in a bank $11,467 Monday, and drew out by check $4,163; on Tuesday he deposited $2,560, and drew out $4,179; on Wednesday he deposited $12,425, and drew out $7,563. Find the balance in the bank on Wednesday night.

16. A miller sold 70 bbl. of flour for $252. How much will he receive for 15 bbl. at the same rate?

17. If 45 men can reap a field of 36 A. in a certain time, how many acres can 25 men reap in the same time?



Let 1, 2, 3, 4, 5, 6, 7, 8, 9, represent flower-beds. Let 10 represent a lawn.

1. Find the area of each, when ¼ in. represents 10 ft. Call the diameter of the circular flower-bed 21 ft.

2. The following represents the report of books taken from a library for five days. Find the totals.

	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Total.
Fiction,	762	856	933	569	975	1084	
History,	321	421	203	122	324	385	
Biography,	217	119	314	213	125	175	
Science,	421	324	386	216	314	564	
Poetry,	313	217	401	79	126	317	
Religion,	98	102	104	37	203	197	
Total,							

3. A table with two leaves is 50 inches wide when the leaves are up and 22 in. wide when the leaves are down. How wide is each leaf.

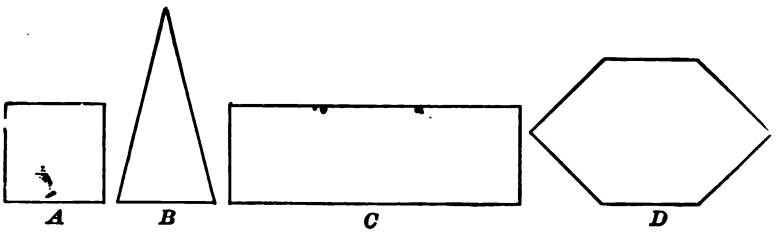
4. Mr. Smith and Mr. Brown live respectively 987 miles and 239 miles west of the center of the same city. How far apart do they live?

5. Mr. Jones lives 987 miles west of the center of a certain city, and Mr. Jackson lives 239 miles east of the same point. How far apart do they live?

6. Find the cost of building 904 miles of railway at $26,342 a mile.

7. Find the cost of 2,631 bu. of wheat at $.82½ a bushel.

ORAL.



1. What form is each figure?
2. Make an estimate of the length of the perimeter of each.
3. What is the sum of the perimeters of all four figures?
4. The perimeter of A is what part of the perimeter of B?
5. The perimeter of A is what part and what per cent of the perimeter of C?
6. The perimeter of A is what part and what per cent of the perimeter of D?
7. The perimeter of A is what part and what per cent of the perimeters of all?
8. The perimeter of B is what part and what per cent of the perimeter of C?
9. The perimeter of B is what part and what per cent of the perimeter of D?
10. The perimeter of B is what part and what per cent of the perimeters of all?
11. The perimeter of C is what part and what per cent of the perimeters of all?
12. Using a scale of $\frac{1}{2}$ inch to 20 ft., find the length of each side and of all the sides of A.
13. Do the same for B. For C. For D.
14. Using the same scale, find the area of A and C. How do they compare?

Using a scale of $\frac{1}{2}$ inch for 40 rd.:

15. Find the perimeter of A. What part of a mile is it?

1. Make out a bill, using the following items: 467 bbl. flour @ \$5.75; 387 bu. corn @ 72¢; 49 bbl. oil @ \$9.72; 56 bbl. beef @ \$17.50. Credit by cash, \$2,250.

2. Multiply 6,845 by .25; by .7; by .725.

3. Divide 23.04 by 3; by 6; by 30.

4. Divide 7.14 by .02; by .3; by .07.

5. How many sheep at \$15 each will pay for 60 cows at \$43.50 each?

Add by columns and lines:

6.

	a.	*b.*	*c.*	*d.*
e.	$\frac{2}{4}$	$\frac{2}{3}$	$\frac{1}{2}$	$\frac{3}{8}$
f.	$\frac{1}{3}$	$\frac{3}{4}$	$\frac{5}{8}$	$\frac{1}{2}$
g.	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{3}{4}$	$\frac{5}{6}$
h.	$\frac{5}{6}$	$\frac{3}{8}$	$\frac{1}{3}$	$\frac{1}{2}$
i.	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{5}{12}$	$\frac{2}{3}$

7.

	a.	*b.*	*c.*	*d.*	*e.*
f.	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{5}{12}$
g.	$\frac{2}{3}$	$\frac{3}{4}$	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{2}{6}$
h.	$\frac{5}{12}$	$\frac{1}{2}$	$\frac{3}{3}$	$\frac{3}{8}$	$\frac{3}{4}$
i.	$\frac{3}{8}$	$\frac{3}{12}$	$\frac{4}{6}$	$\frac{3}{3}$	$\frac{1}{8}$
j.	$\frac{4}{6}$	$\frac{3}{8}$	$\frac{3}{4}$	$\frac{3}{12}$	$\frac{1}{2}$

8. *a.* $46\frac{1}{2}\frac{5}{9} - 4\frac{9}{11}$. *b.* $96\frac{3}{3}\frac{5}{5} - 45\frac{7}{8}$. *c.* $200\frac{3}{8} - 90\frac{17}{18}$.
d. $78\frac{3}{4}\frac{5}{8} - 21\frac{6}{7}$. *e.* $42\frac{4}{18} - 16\frac{3}{4}$. *f.* $173\frac{1}{2}\frac{9}{7} - 72\frac{5}{8}$.

9. How many feet of barbed wire will be required to go round a field $194\frac{5}{12}$ ft. long and $84\frac{1}{6}$ ft. wide?

10. A man bought some wheat for \$42⅜, and some corn for \$27¾. If he paid \$51½, how much does he still owe?

11. How many feet round a field that is 42¼ rd. long, and 36¾ rd. wide? How many yards is it?

12. If barbed wire costs 2¢ a foot, what will it cost to put 5 wires round the above field?

13. A man left a fortune of \$96,420. His wife received ⅜, his son ¼, and his niece the remainder. How much did each receive?

14. A farm is divided into 4 fields containing 19¾ A., $45\frac{5}{12}$ A., 35⅓ A., and 62½ A. How many acres in the farm?

15. Buy an article for \$99¼, and sell it for \$102⅛. Find the gain on 48 articles.

ORAL.

1. What is the interest of $210 for 1 yr. 8 mo. at 6%?

2. Sold a watch which cost me $40 at a profit of 20%. How much did I gain?

3. By selling a barrel of flour at 25% above cost, I gained $1.50. What was the cost?

4. George has 24 marbles, which is 12% of the number he had at first. How many had he at first?

5. A boy has 3% of his marbles left. If he has 30 left, how many had he at first?

6. What per cent of $160 is $8?

7. What per cent of 28 miles is 7 miles?

8. If June 23 is Wednesday, what day of the week will July 4 be?

9. What will 48 doz. buttons cost at $1¼ a gross?

10. A rectangular board 20 ft. long contains 60 square feet. What is the width of the board?

11. How much will 44 eggs cost at 15¢ a dozen?

12. If you have 64 gills of nuts, how many pecks will you have?

13. How old must a man be to be 3 score and 6 years old?

14. A rectangular block contains 64 cu. in. It is 8 in. long and 4 in. wide; how thick is it?

15. How many quarts in 8 gal. 3 qt.?

16. How many ounces in 3 lb. 6 oz.?

17. How many seconds in 3 min.? 5 min.?

18. How many minutes in 2 hr.? In 3 hr.?

19. How many pints in 8 qt.? 10 qt.?

20. How many quarts in 32 pt.? 40 pt.?

21. How many cubic inches in 1 cubic foot?

22. How many cubic feet in 2 cubic yards?

23. When a sheet is folded in two leaves it is called a folio. How many folios will 1 quire make?

INTEREST FOR DAYS.

1. What is the interest on $1 for 2 mo., or 60 days?

2. 6 days is what part of 60 days?

3. The interest on $1 for 6 days is what part of the interest for 60 days?

4. What is $\frac{1}{10}$ of .01?

5. What is the interest of $1 for 6 days?

6. If the the interest on $1 for 6 days is 1 mill, what is the interest on $2? $7?

7. At the same rate, the interest on $100 is how many times .001?

8. Multiply .001 by 100; by 200; by 600; by 1000.

9. Tell a short way to multiply .001 by any number.

10. How many places to the left do you move the point?

11. Moving the point three places to the left is the same as multiplying by what?

12. Moving the point three places to the left gives the interest on any sum of money for how many days?

13. Find the interest at 6% for 6 days on the sums of money given in Lesson 37.

14. Tell a short way to find the interest for 12 days.

15. Find the interest on $600 for 12 days.

$.600	interest for 6 days.
2	
$1.200	interest for 12 days.

16. How do you find the interest for 18 days? For 24 days?

17. Find the interest on $1,240 for 18 days.

18. Find the interest on $480 for 24 days.

19. Find the interest on $697 for 12 days.

20. Find the interest on $368 for 30 days.

21. Find the interest on $267 for 36 days.

22. Find the interest on $142 for 42 days.

23. Find the interest on $612 for 18 days.

Find the interest:

1. Of $846 for 1 yr. 2 mo.
2. Of $846 for 12 days.
3. Of $846 for 1 yr. 2 mo. 12 days.
4. Of $1,728 for 1 yr. 4 mo. 6 da. For 1 yr. 8 mo. 18 da
5. Of $466.56 for 8 mo. 12 da. For 1 yr. 6 mo. 12 da.
6. Of $2,304 for 10 mo. 18 da. For 1 yr. 4 mo. 12 da.
7. Of $450 for 1 yr. 3 mo. 6 da. For 1 yr. 7 mo. 18 da.
8. Of $800 for 1 yr. 5 mo. 12 da. For 1 yr. 9 mo. 12 da.
9. Of $375 for 24 days. For 1 yr. 5 mo. 18 da.
10. Of $323.50 for 1 yr. 10 mo. 18 da. For 11 mo. 12 da.
11. Of $960 for 1 yr. 3 mo. 18 da. For 5 mo. 6 da.
12. Of $842 for 9 mo. 12 da. For 1 yr. 3 mo. 18 da.
13. Of $700 for 6 mo. 18 da. For 1 yr. 9 mo. 24 da.
14. Of $1,200 for 4 mo. 12 da. For 1 yr. 6 mo. 6 da.
15. Of $900 for 1 yr. 7 mo. 18 da. For 1 yr. 5 mo. 24 da.
16. Of $1,400 for 11 mo. 12 da. For 1 yr. 2 mo. 18 da.
17. Of $976.25 for 4 mo. For 1 yr. 5 mo. 12 da.
18. Of $846.78 for 1 yr. 6 mo. For 1 yr. 9 mo. 12 da.
19. Of $180 for 1 yr. 3 mo. 24 da. For 1 yr. 5 mo. 18 da.
20. Of $680.60 for 10 mo. For 1 yr. 11 mo. 12 da.
21. Of $211.25 for 1 yr. 5 mo. For 1 yr. 6 mo. 18 da.
22. Of $1,234.50 for 1 yr. 3 mo. 18 da. For 1 yr. 2 mo. 24 da.
23. Of $666.60 for 1 yr. 2 mo. 12 da. For 1 yr. 3 mo. 18 da.
24. Of $888.80 for 1 yr. 8 mo. 18 da. For 1 yr. 5 mo. 24 da.
25. Of $555.50 for 1 yr. 4 mo. 6 da. For 1 yr. 7 mo. 30 da.
26. Of $368.60 for 1 yr. 6 mo. 24 da. For 1 yr. 9 mo. 12 da.
27. Of $169.50 for 1 yr. 10 mo. 12 da. For 1 yr. 11 mo. 18 da.
28. Of $444.40 for 1 yr. 2 mo. 6 da. For 1 yr. 3 mo. 24 da.
29. Of $333.30 for 1 yr. 4 mo. 12 da. For 1 yr. 5 mo. 18 da.
30. Of $777.70 for 1 yr. 6 mo. 18 da. For 1 yr. 9 mo. 30 da.
31. Of $999.90 for 1 yr. 8 mo. 24 da. For 1 yr. 9 mo. 24 da.
32. Of $1,224.60 for 1 yr. 10 mo. 12 da. For 1 yr. 11 mo. 18 da.

ORAL.

Find the cubic feet in the following:

1. A box 2 ft. by 3 ft. by 3 ft.
2. A box 3 ft. by 2 ft. by 6 ft.
3. A box 2 ft. by 2 ft. by 2 ft.
4. A box 2 ft. by 2 ft. by 3 ft.
5. A box 5 ft. by 2 ft. by 3 ft.
6. A box $4\frac{1}{2}$ ft. by 2 ft. by 3 ft.
7. A box $3\frac{1}{3}$ ft. by 2 ft. by 2 ft.
8. A box $2\frac{1}{2}$ ft. by 2 ft. by 3 ft.
9. A box 3 ft. by 3 ft. by 3 ft.
10. A box 5 ft. by 4 ft. by 6 ft.

Perform the following in 2 ways:

11. If you had 8 apples, and gave me $\frac{1}{4}$ of $\frac{1}{2}$ of them, how many would you give me?
12. Give me $\frac{1}{2}$ of $\frac{1}{4}$ of 8 apples.
13. Give me $\frac{1}{3}$ of $\frac{3}{4}$ of 8 apples.
14. Give me $\frac{1}{6}$ of $\frac{3}{4}$ of 8 apples.
15. Give me $\frac{1}{4}$ of $\frac{4}{8}$ of 8 apples.
16. Give me $\frac{1}{2}$ of $\frac{4}{8}$ of 8 apples.
17. Give me $\frac{3}{8}$ of $\frac{3}{4}$ of 8 apples.

Suppose you have 15 apples,

18. Give me $\frac{1}{3}$ of $\frac{1}{5}$ of them.
19. Give me $\frac{2}{3}$ of $\frac{3}{5}$ of them.
20. Give me $\frac{3}{5}$ of $\frac{2}{3}$ of them.
21. Give me $\frac{1}{5}$ of $\frac{2}{3}$ of them.
22. Give me $\frac{2}{5}$ of $\frac{2}{3}$ of them.
23. Give me $\frac{2}{5}$ of $\frac{3}{5}$ of them.
24. A horse cost \$90 and a sleigh $\frac{2}{3}$ as much. Find the cost of both.
25. A man bought a hat for \$3.50 and a tie for 75 cents. How much change should he receive from a \$5 bill?
26. \$1, less the cost of 3 pk. of peas at 20¢ a peck, equals what?
27. If \$63 was paid for 9 yd. of cloth, what was the cost of 7 yd.?

LESSON 56.

TO CHANGE A COMMON FRACTION TO A DECIMAL.

Change $\frac{5}{8}$ to a decimal.

$$\begin{array}{r} 8\overline{)5.000} \\ .625 \end{array}$$

$\frac{5}{8}$ is an expression of division. 5 is the dividend, and 8 is the divisor. This means, then, find $\frac{1}{8}$ of 5. Since 8 is not contained in 5 units, we change 5 units to 50 tenths. 8 is contained in 50 tenths 6 tenths times, etc.

1. Change to decimals:

$\frac{3}{8}$; $\frac{1}{3}$; $\frac{3}{7}$; $\frac{7}{16}$; $\frac{7}{8}$; $\frac{3}{4}$; $\frac{9}{10}$.

2. Change to decimals:

$\frac{4}{5}$; $\frac{27}{32}$; $\frac{36}{55}$; $\frac{14}{25}$; $\frac{13}{18}$.

3. Change to decimals:

$\frac{5}{24}$; $\frac{15}{16}$; $\frac{4}{9}$; $\frac{5}{11}$; $\frac{9}{15}$.

4. Change to decimals:

$\frac{2}{3}$; $\frac{3}{8}$; $\frac{10}{13}$; $\frac{21}{35}$; $\frac{14}{15}$.

5. Change to decimals:

$\frac{6}{8}$; $\frac{11}{12}$; $\frac{3}{5}$; $\frac{8}{8}$; $\frac{4}{5}$.

6. Reduce to decimals:

$\frac{6}{8}$; $\frac{3}{16}$; $\frac{3}{32}$; $\frac{9}{16}$; $\frac{5}{32}$; $\frac{7}{20}$; $\frac{9}{20}$.

7. Change to decimals:

$\frac{3}{125}$; $\frac{5}{128}$; $\frac{3}{40}$; $\frac{7}{80}$; $\frac{9}{40}$; $\frac{5}{80}$.

8. Change to decimals:

$\frac{13}{16}$; $\frac{17}{32}$; $\frac{13}{32}$; $\frac{5}{24}$; $\frac{5}{16}$; $\frac{21}{32}$.

9. Change to decimals:

$\frac{3}{64}$; $\frac{6}{20}$; $\frac{9}{128}$; $18\frac{3}{4}$; $5\frac{7}{16}$; $9\frac{11}{32}$.

10. Change to decimals:

$4\frac{1}{5}$; $3\frac{5}{8}$, $76\frac{5}{8}$; $\frac{1}{12}$; $\frac{3}{24}$; $\frac{1}{6}$; $3\frac{1}{3}$.

11. Change to decimals:

$9\frac{2}{7}$; $\frac{41}{56}$; $\frac{3}{25}$; $13\frac{7}{16}$; $18\frac{6}{75}$; $\frac{12}{1000}$.

12. Change to decimals:

$\frac{108}{1250}$; $\frac{27}{60}$; $\frac{26}{40}$; $\frac{110}{128}$; $\frac{25}{75}$; $\frac{21}{30}$.

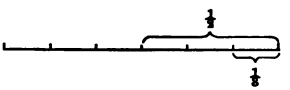
13. Change to decimals:

$\frac{13}{25}$; $\frac{19}{200}$; $\frac{321}{500}$; $\frac{2}{25}$; $\frac{157}{200}$; $\frac{3}{200}$.

LESSON 57.

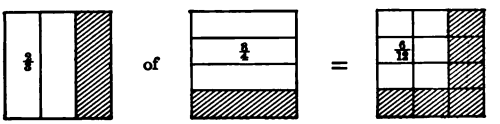
TO MULTIPLY A FRACTION BY A FRACTION, OR TO FIND A FRACTIONAL PART OF A FRACTION.

1. Mary had $\frac{1}{2}$ of a yard of cloth, and used $\frac{1}{3}$ of it. How much of a yard did she use?



The line represents 1 yard. The broad part represents the $\frac{1}{2}$ that Mary had. She used $\frac{1}{3}$ of this. Her part is divided into thirds, and the third that she used is indicated. If we divide the whole yard into pieces of the same size we shall have 6 of them; so that the part she used is $\frac{1}{6}$ of the whole yard.

2. Mary had $\frac{2}{3}$ of a yard, and used $\frac{3}{4}$ of it. How much of a yard did she use?



3. Multiply $\frac{2}{3}$ by $\frac{3}{4}$.

$\frac{1}{3}$ of $\frac{3}{4} = \frac{1}{4}$
$\frac{2}{3} = 2 \times \frac{1}{4} = \frac{2}{4} = \frac{1}{2}$

This means find $\frac{2}{3}$ of $\frac{3}{4}$. We first find $\frac{1}{3}$ of $\frac{3}{4}$, which is $\frac{1}{4}$. $\frac{2}{3}$ will be $2 \times \frac{1}{4}$, which are $\frac{2}{4}$ or $\frac{1}{2}$.

4. Multiply $\frac{3}{4}$ by $\frac{5}{6}$.

$$\frac{3}{4} \times \frac{5}{6} = \frac{3 \times 5}{4 \times 6} = \frac{15}{24} = \frac{5}{8}.$$

In this case we cannot easily find $\frac{1}{4}$ of $\frac{5}{6}$, so we multiply as indicated in the illustration.

5. Multiply $8\frac{4}{5}$ by $5\frac{1}{4}$. Multiply as in whole numbers, without changing to mixed numbers.

$8\frac{4}{5}$
$5\frac{1}{4}$
$2\frac{1}{5}$
4
40
$46\frac{1}{5}$

First $\frac{1}{4} \times \frac{4}{5} = \frac{1}{5}$. Next $\frac{1}{4} \times 8 = \frac{8}{4} = 2$. Next $5 \times \frac{4}{5} = \frac{20}{5} = 4$. And last, $5 \times 8 = 40$. Add the partial products. Do this work mentally, setting down only results.

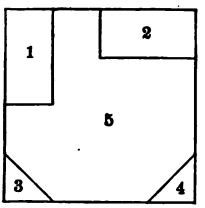
6. Multiply: $\frac{3}{5}$ by $\frac{4}{5}$; $\frac{5}{9}$ by $\frac{18}{30}$; $\frac{4}{5}$ by $\frac{12}{24}$; $\frac{4}{5}$ by $\frac{8}{9}$; $\frac{3}{8}$ by $\frac{5}{12}$; $1\frac{8}{9}$ by $1\frac{5}{16}$.

7. Multiply: $5\frac{3}{4}$ by $4\frac{2}{5}$; $4\frac{3}{4}$ by $3\frac{1}{2}$; $16\frac{1}{2}$ by $4\frac{3}{4}$; $5\frac{1}{3}$ by $6\frac{1}{5}$; $6\frac{2}{3}$ by $3\frac{1}{3}$; $21\frac{2}{3}$ by $6\frac{2}{7}$.

8. Multiply: $\frac{4}{5}$ by $\frac{5}{8}$; $\frac{5}{8}$ by $\frac{8}{7}$; $12\frac{1}{2}$ by $6\frac{2}{3}$.

Find the cost of:

1. $424\frac{1}{3}$ lb. starch @ $9\frac{1}{4}$¢.
2. $88\frac{3}{4}$ bu. wheat @ $88\frac{3}{8}$¢.
3. $48\frac{5}{8}$ tons of coal @ $\$6\frac{1}{4}$.
4. $24\frac{1}{2}$ gal. oil @ $12\frac{1}{2}$¢.
5. $64\frac{1}{2}$ bbl. flour @ $\$6\frac{3}{4}$.
6. $15\frac{3}{4}$ lb. coffee @ $35\frac{3}{5}$¢.
7. $3\frac{5}{7}$ bu. apples @ $\$\frac{3}{8}$.
8. $16\frac{3}{4}$ tons of hay @ $\$16\frac{1}{8}$.
9. $15\frac{7}{8}$ bbl. of flour @ $\$6\frac{3}{4}$.
10. $8\frac{3}{5}$ yd. cloth @ $\$2\frac{1}{4}$.
11. $25\frac{3}{5}$ cd. wood @ $\$3\frac{3}{4}$.
12. $52\frac{1}{2}$ bu. wheat @ $62\frac{1}{2}$¢.
13. If $\frac{3}{5}$ of A's farm cost $\$2{,}480$, what did the whole farm cost?
14. If $\frac{9}{10}$ of a yard of cloth cost $\$2.10$, what will 9 yd. cost?
15. If $\frac{5}{8}$ of a hundred-weight of sugar cost $\$12.45$, what will be the cost of 20 hundred-weight?
16. $\$46\frac{7}{8}$ is $\frac{15}{16}$ of what I paid for 1 horse. At the same rate, what would I have paid for 4 pairs of horses?
17. Find the area of the top of a table $8\frac{1}{4}$ ft. by $4\frac{1}{2}$ ft.
18. Find the area of a blackboard $32\frac{1}{4}$ by $4\frac{1}{2}$ ft.
19. Find the area of an oilcloth $4\frac{1}{2}$ by $16\frac{3}{4}$ ft.
20. Find the area of a rectangular field $36\frac{1}{4}$ rd. by $40\frac{2}{3}$ rd.
21. Find the area of a rectangular field $75\frac{3}{4}$ rd. by $32\frac{2}{3}$ rd.
22. Find the area of a rectangular field $80\frac{5}{8}$ rd. by $36\frac{4}{5}$ rd.
23. Find the area of a rectangular field $70\frac{5}{12}$ rd. by $96\frac{5}{10}$ rd.
24. Find the area of a rectangular field $48\frac{3}{4}$ rd. by $50\frac{5}{8}$ rd.
25. A man bought 400 bu. of potatoes at 45¢ a bushel. For how much must he sell them a bushel to gain $\$7.00$?
26. A man bought 168 sheep at $\$5\frac{1}{2}$ a head. He sold $\frac{3}{7}$ of them at $\$6$ a head, and the remainder at $\$7$ a head.
27. Find the number of cubic inches in a stick of timber 8 ft. long, and 1 foot square at the end.



1. If the scale is ¼ in. for 5 ft., find the area of each flower-bed and of the lawn. 1, 2, 3, 4 are flower-beds. 5 is a lawn.

2. What shall I pay for 3,000 pins at 37½¢ a gross?

3. Mr. Farmer sells Mr. Grocer 25 bu. of potatoes @ 62½¢; 9 bu. onions @ $1.13; 84 lb. butter @ 33⅓¢; 13 doz. eggs @ 28¢. He buys of him 2½ lb. tea @ 75¢; 6 lb. coffee @ 38⅓¢; 37½ yd. cloth @ 12½¢; sundries, $3.72. How shall they settle?

4. $12 is 30% of the cost of my watch. Should I gain or lose, and how much, if I sell it for $50?

5. A right prism of marble, 8 ft. long and 18 in. square, is bought for a monument at $3.25 a cubic foot. Find the cost of the marble. If it costs 65¢ a square foot to polish it, find the cost of polishing all but one end?

6. Find the interest on $165.95 for 3 mo. 18 days at 6%.

7. I have a rectangular piece of ice that measures 2½ ft. by 1¼ ft. by 1 foot. If 1 cubic foot weighs 57 lb., find the weight of the piece?

8. What number must be added to $175\frac{5}{12}$ to make $317\frac{1}{3}$?

9. Charles missed 29 words in a month. If 580 were given him, what was his per cent in spelling for the month?

10. I bought 18 tons of coal @ $5.75, and 7½ cd. of wood @ $5.50. What did the whole cost me? What would be my selling price to gain 20%?

11. Write a demand note.

12. Write a time note.

13. Find the interest on the time note that is written.

14. Find the interest on $144 for 1 yr. 7 mo. 24 da. at 6%.

15. A dealer sold 580 bu. of potatoes at 75¢ a bushel, and wheat for 6 times as much. How much did he receive for both?

LESSON 60

ORAL.

1. Given the cost of one article and the number of articles. What can you find? How?

2. Given the cost of all the articles and the number of articles. What can you find? How?

3. Given the cost of all the articles and the cost of one article. What can you find? How?

4. Given the cost and selling price. What can you find? How?

5. Given the gain and selling price. What can you find? How?

6. Given the cost and loss. What can you find? How?

7. Given the loss and selling price. What can you find? How?

8. Given the sum of two numbers and one number. What can you find? How?

9. Given the sum of several numbers and all but one of the numbers. How can you find the other number?

10. Given two numbers. What things can you find?

11. Given the product of two numbers and one number. What can you find? How?

12. Given the difference of two numbers and one number. What can you find? How?

13. Given the quotient of two numbers and the smaller number. What can you find? How?

14. Given the quotient of two numbers and the larger number. What can you find? How?

15. Given the length and breadth of a rectangle. What can you find? How?

16. Given the area and one side of a rectangle. What can you find? How?

17. Given the dimensions of a right prism. What can you find? How?

1. A real estate dealer bought a house for $2,150. After painting it at an expense of $365, he sold it for $2,795.

2. Mr. D. C. Moore, on May 2, 1898, bought of Austin & Co., 14 lb. tea @ 65¢; 25 lb. starch @ $.05½; 55 lb. soap @ $.06¼; 70 lb. coffee @ $.22; 160 lb. "A" sugar @ $.04⅝; 65 lb. rice @ $.06½.

On June 3, he bought 40 lb. crackers @ $.06¾; 1 doz. bottles mustard @ $.25; 2 doz. olive oil @ 60¢; 25 lb. cheese @ 9½¢; 7 bbl. flour @ $5.25; 28 lb. of raisins @ $.24; 15 lb. currants @ 11½¢; 7 doz. gelatine @ 15¢. On June 10 he paid $75.00. July 2, he paid in full.

Render an itemized bill June 1. A statement July 1. A receipted bill July 2.

3. A farmer bought 29 head of cattle for $928, and sold them at an average gain of $5 a head. How much did he get for them?

4. By selling a carriage for $178, I lost $27. What did it cost me?

5. A builder paid $78.20 for cement. If it cost him 85¢ a barrel, how many barrels did he buy?

6. A merchant having $135 bought 9 coats and had $18 left. What did he pay for each coat?

7. A drover bought 32 head of cattle for $800, and sold them all for $1,120. What was the average gain on each?

8. A farmer sold 6 bu. 3 pk. of potatoes at 60¢ a bushel. How much did he receive for them?

9. A miller bought 350 bu. of wheat at $1.04 a bushel, and sold the flour and bran for $539. What was the gain on a bushel?

10. If ¾ of a barrel of flour is worth $4.80, what is a barrel worth?

11. If a barrel of flour is worth $5.60, how much will ⅜ of a barrel cost?

ORAL.

What must be given to find:

1. Area of a circle? Area of a rectangle?
2. Selling price of an article? Area of a triangle?
3. Interest? Sum? Difference or remainder?
4. Product? Quotient? Per cent of gain? Gain?
5. $\frac{3}{8}$ of 15 are ——. 15 is $\frac{3}{8}$ of ——.
6. 12 is —— of 18. $\frac{3}{4}$ of 12 are ——.
7. $\frac{2}{3}$ of 15 are ——. 14 is $\frac{2}{3}$ of ——.
8. $\frac{1}{7}$ of 63 is ——. 6 is $\frac{1}{7}$ of ——.
9. $\frac{2}{7}$ of 63 are ——. 6 is $\frac{2}{7}$ of ——.
10. $\frac{1}{9}$ of 63 is ——. 6 is $\frac{1}{9}$ of ——.
11. $5\frac{1}{2}$ ft. are —— in. $5\frac{1}{4}$ ft. are —— in.
12. $5\frac{1}{3}$ ft. are —— in. $5\frac{1}{8}$ ft. are —— in.
13. $4\frac{1}{3}$ ft. are —— in. $4\frac{1}{4}$ ft. are —— in.
14. 1 lb. 4 oz. of cheese at 16¢ a pound will cost —— cents.
15. When candy is 10¢ a pound, for 25 cents I can buy —— lb. and —— oz.
16. Mary has a rectangular flower-bed. It is 4 ft. long and half as wide as it is long. Find its perimeter and area.
17. Helen has a square picture-frame. It is $10\frac{1}{2}$ in. from one corner to the next corner. What is the distance round the frame?
18. $\frac{3}{7}$ of 49 are $\frac{1}{5}$ of what number?
19. I buy a bushel of walnuts for $2, and sell them at 10¢ a quart. What is my gain?
20. Mary paid $.75 for a sled, and $3 for a pair of shoes. How much did she pay for both?
21. A man who owned a sailboat sold $\frac{5}{16}$ of it to a friend. What part did he still own?
22. What will 5 yd. of cloth cost, if 12 yd. cost $48?
23. If .5 of a peck of corn cost 10 cents, what will .5 of a bushel cost?

LESSON 63.

TO DIVIDE A FRACTION BY A FRACTION.

$\frac{2}{3} = 1\frac{8}{12}$
$\frac{3}{4} = 1\frac{9}{12}$
$1\frac{8}{12} \div 1\frac{9}{12} = 8 \div 9 = \frac{8}{9}$

1. Divide $\frac{2}{3}$ by $\frac{3}{4}$.
2. Divide $1\frac{9}{10}$ by $\frac{2}{5}$. $1\frac{3}{4}$ by $\frac{2}{7}$.
3. Divide $\frac{8}{9}$ by $\frac{4}{6}$. $\frac{5}{8}$ by $1\frac{7}{12}$.
4. Divide $1\frac{4}{12}$ by $\frac{3}{4}$. $1\frac{7}{14}$ by $\frac{6}{7}$.
5. Divide $1\frac{3}{10}$ by $1\frac{5}{12}$. $\frac{8}{8}$ by $\frac{8}{27}$.
6. Divide:

a	*b*	*c*	*d*
$\frac{3}{8}$ by $\frac{3}{4}$	$\frac{3}{4}$ by $\frac{2}{3}$	$\frac{5}{8}$ by $\frac{3}{4}$	$\frac{3}{7}$ by $1\frac{2}{14}$
$\frac{3}{4}$ by $\frac{7}{8}$	$\frac{6}{8}$ by $\frac{3}{3}$	$1\frac{9}{10}$ by $\frac{3}{5}$	$1\frac{7}{12}$ by $\frac{6}{8}$

7. Divide:

a	*b*	*c*	*d*
$1\frac{3}{16}$ by $\frac{1}{8}$	$\frac{7}{8}$ by $\frac{2}{5}$	$1\frac{2}{14}$ by $\frac{4}{7}$	$\frac{5}{7}$ by $\frac{2}{3}$
$\frac{3}{4}$ by $\frac{1}{2}$	$\frac{7}{8}$ by $\frac{3}{4}$	$\frac{5}{6}$ by $\frac{1}{2}$	$1\frac{9}{10}$ by $\frac{3}{4}$

8. Divide:

a	*b*	*c*	*d*
$\frac{5}{8}$ by $\frac{3}{3}$	$1\frac{9}{12}$ by $\frac{3}{8}$	$\frac{4}{5}$ by $\frac{2}{3}$	$\frac{7}{5}$ by $\frac{4}{7}$
$\frac{2}{8}$ by $1\frac{9}{10}$	$\frac{35}{39}$ by $\frac{10}{13}$	$1\frac{2}{15}$ by $\frac{3}{7}$	$1\frac{1}{12}$ by $\frac{47}{60}$

9. Divide:

a	*b*	*c*	*d*
$\frac{17}{20}$ by $\frac{3}{5}$	$\frac{11}{33}$ by $1\frac{7}{11}$	$\frac{1}{6}$ by $\frac{3}{8}$	$\frac{4}{5}$ by $\frac{6}{8}$
$1\frac{8}{15}$ by $\frac{1}{7}$	$1\frac{9}{16}$ by $\frac{3}{4}$	$1\frac{9}{16}$ by $\frac{3}{20}$	$\frac{3}{20}$ by $1\frac{9}{16}$

10. Divide:

a	*b*	*c*	*d*
$\frac{15}{24}$ by $\frac{5}{6}$	$\frac{12}{33}$ by $1\frac{9}{11}$	$\frac{3}{4}$ by $1\frac{9}{16}$	$1\frac{4}{11}$ by $\frac{3}{5}$
$\frac{18}{27}$ by $\frac{8}{5}$	$\frac{23}{6}$ by $\frac{45}{9}$	$\frac{4}{7}$ by $\frac{3}{5}$	$1\frac{7}{24}$ by $\frac{5}{6}$

NOTE. — Mixed numbers should first be changed to improper fractions.

11. Divide:

a	*b*	*c*	*d*
$4\frac{3}{5}$ by $6\frac{9}{10}$	$84\frac{3}{8}$ by $4\frac{1}{2}$	$28\frac{4}{5}$ by $4\frac{1}{2}$	$4\frac{3}{8}$ by $1\frac{3}{8}$
$8\frac{4}{5}$ by $12\frac{2}{3}$	$45\frac{5}{8}$ by $12\frac{1}{2}$	$16\frac{3}{4}$ by $12\frac{1}{2}$	$3\frac{5}{8}$ by $6\frac{3}{4}$

12. Divide:

a	*b*	*c*	*d*
$14\frac{3}{8}$ by $17\frac{1}{2}$	$9\frac{1}{14}$ by $32\frac{5}{7}$	$24\frac{1}{2}$ by $2\frac{1}{3}$	$9\frac{3}{5}$ by $5\frac{5}{6}$
$5\frac{3}{8}$ by $7\frac{5}{6}$	$2\frac{1}{3}$ by $5\frac{1}{4}$	$6\frac{2}{3}$ by $4\frac{4}{5}$	$18\frac{3}{7}$ by $\frac{3}{5}$

1. Add: Six thousand, seven hundred thirty-six and four thousandths; ninety-three thousand, four hundred fifty-three and three hundredths; two million, one hundred seven thousand, fifty-six and one hundred five ten-thousandths.

2. What does MMDCCLXXXVI stand for?

3. The following bushels of grain were exported from Boston in one week:

	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
Corn,	28,325	15,236	35,715	75,183	29,128	46,217
Wheat,	35,719	41,719	50,108	59,275	32,546	81,126
Oats,	12,136	9,237	18,265	6,950	7,268	17,230
Barley,	18,230	15,738	21,375	19,263	15,928	13,637
Rye,	5,275	6,829	7,201	7,825	11,325	13,261
Totals,						

4. What is the total weight of 5,378 bales of cotton, which average 397 pounds a bale?

5. A drover invested $19,454 in buying 137 horses. What was the average price?

6. Divide 682,848 by 8,000. 687,198 by 53,000.

7. Add eighteen dollars and thirty-two cents; seventy-five dollars and eight cents; 419 dollars and 5 cents; 87 dollars and 30 one-hundredths; 36 dollars, 14 cents.

8. A farmer sold to a merchant 15 lb. butter @ 28¢; 25 doz. eggs @ 14¢; 5 doz. chickens @ $2.20; and in payment received 4 gal. molasses @ 55¢; 9 lb. coffee @ 28¢; 1 bbl. flour, $6.42; and the remainder in sugar at 7¢ a pound. How many pounds of sugar did he receive?

9. Reduce $\frac{1}{5}$ to 15ths. $\frac{1}{4}$ to 28ths. $\frac{3}{8}$ to 24ths.

10. Reduce to lowest terms: $\frac{8}{16}$, $\frac{24}{36}$, $\frac{15}{18}$, $\frac{33}{40}$.

11. Reduce to improper fractions:

$5\frac{3}{8}$, $9\frac{5}{6}$, $12\frac{3}{5}$, $23\frac{1}{4}$, $38\frac{3}{4}$, $135\frac{5}{12}$.

12. Find the difference between $618\frac{3}{4}$ and $327\frac{1}{4}$.

ORAL.

1. John was sent to the store with 60 cents to buy 3 lb. of beef @ 11¢, 6 lb. rhubarb @ 2¢, 2 bunches of radishes @ 5¢. How many cents should he bring back?

2. Reckon change from $1 for 3 bunches of asparagus @ 8¢, 2 qt. potatoes @ 10¢, lettuce, 13¢.

3. 363 children are marching in 3 equal rows. How many are there in a row?

4. If a party of 10 men catch 55 lb. of fish, how many pounds and ounces ought each man to have?

5. If $81 is paid for 9 weeks' labor, what should be paid for 4 weeks'? 7 weeks'? 12 weeks'?

6. What is $\frac{1}{2}$ of $\frac{1}{4}$? $\frac{1}{2}$ of $\frac{1}{5}$? $\frac{1}{2}$ of $\frac{1}{6}$? $\frac{1}{3}$ of $\frac{1}{2}$? $\frac{1}{3}$ of $\frac{1}{4}$?

7. What is $\frac{1}{3}$ of $\frac{1}{6}$? $\frac{1}{4}$ of $\frac{1}{5}$? $\frac{1}{5}$ of $\frac{1}{3}$? $\frac{1}{5}$ of $\frac{1}{6}$? $\frac{1}{6}$ of $\frac{1}{2}$?

8. What is $\frac{1}{3}$ of $\frac{2}{5}$? $\frac{2}{5}$ of $\frac{3}{4}$? $\frac{2}{5}$ of $\frac{3}{7}$? $\frac{1}{7}$ of $\frac{3}{5}$? $\frac{3}{5}$ of $\frac{3}{8}$?

9. The difference between $\frac{1}{2}$ and $\frac{1}{4}$ of a pile of apples is 8 quarts. How many quarts are there in the pile?

10. If $\frac{1}{3}$ of a yard of silk costs 1\frac{1}{2}$, what will 1 yd. cost?

11. A grocer sold eggs at 20¢ a dozen, which was $\frac{4}{5}$ of what they cost him. What did they cost him?

12. $6\frac{1}{4}$ is $\frac{5}{8}$ of what number?

13. $4\frac{1}{2}$ is $\frac{3}{10}$ of what number?

14. A farmer sold 6 pigs for $24, which was $\frac{4}{5}$ of what he paid for them. What did he pay for one?

15. If 9 bottles of ink cost 2\frac{1}{4}$, what will 5 bottles cost?

16. If 6 lb. of lead cost 1\frac{1}{3}$, what will 7 lb. cost?

17. What is 1% of 2,000? 3%? 5%? $6\frac{1}{4}$%?

18. 120 bu. is 60% of how many bushels?

19. $80 is 40% of how many dollars?

20. Nellie spelled correctly 97% of the words given to her class. She missed nine words. What per cent did she miss? How many words were given out?

21. Find 20% of $465. 25% of $178.

1. Change the following to decimals:

$\frac{3}{8}$ lb. $\frac{7}{8}$ oz. $\frac{3}{16}$ yr. $\frac{2}{16}$ bbl. $\frac{11}{32}$ yd. $\frac{18}{32}$ qt.

2. Multiply .00036 by .0046. 21.5¾ by 175.

3. Divide 44.65 by .005. 43.2 by .0016.

4. Find the cost of the following: 5,308 lb. @ 25¢.

5. 324 gal. @ 12½¢. 6. 6,715 lb. @ 20¢.

7. 295 bu. @ 50¢. 8. 684 gal. @ 33⅓¢.

9. 628 gal. @ 66⅔¢. 10. 525 lb. @ $1.25.

11. Nov. 18, Mr. Geo. W. Hammond bought of Smith & Packard 4 lb. Java coffee @ 30¢; ½ lb. Oolong tea @ 70¢; 15 lb. granulated sugar @ 7½¢; 10 lb. A sugar @ 6½¢. Dec. 10, he bought 8 lb. rice @ 6¼¢; 2 gal. sirup @ 75¢; ½ gal. molasses @ 70¢; $\frac{5}{12}$ doz. cans tomatoes, $0.50. Dec. 20 he paid $5. Jan. 5 he bought ¼ doz. cans strawberries @ 55¢; 3 lb. cheese @ 5¢; 2½ lb. butter @ 40¢; 7 lb. crackers @ 6¢. Render an itemized bill Dec. 1. Render a statement and bill Jan. 1. Write a letter Feb. 10, asking for immediate payment.

12. Change 1 gal. 3 qt. 1 pt. 3 gi. to gills.

13. Change 17 T. 18 lb. to ounces.

14. Change 4,918 cu. ft. to cords.

15. How many square feet in a sidewalk 48 ft. long, and 11 ft. 4 in. wide?

16. How many square yards are there in the walls and ceiling of a room 24 ft. long, 18 ft. wide, and 12 ft. high?

17. If a rectangular field containing 4,800 sq. rd. is 40 rd. wide, what is its length?

18. How much should be paid for a pile of wood 3 ft. long, 4 ft. wide, and 5 ft. high, at $6.50 a cord?

19. A pentagonal pyramid has a base measuring 6 ft. on a side, and a slant height of 18 ft. Find its convex surface measurement.

20. A park is in the form of a triangle whose base is 40 ft. and altitude 40 ft. Find its area.

	A	*B*	*C*	*D*	*E*
1.	84,965	87,239	53,734	59,549	46,752
2.	77,349	54,873	72,341	28,325	37,843
3.	46,870	69,472	85,926	54,967	15,673
4.	98,964	58,363	83,934	83,394	54,683
5.	60,874	43,257	47,365	39,432	37,493
6.	85,967	98,465	21,984	64,756	84,257
7.	56,948	75,335	76,623	61,537	19,438
8.	97,474	34,712	37,275	95,643	53,729
9.	59,275	45,275	67,893	63,483	45,384
10.	45,293	84,963	43,739	91,456	73,689
11.	48,697	92,748	58,934	73,714	54,368
12.	29,760	64,567	79,763	46,539	72,993
13.	94,505	84,379	84,329	84,357	57,842
14.	73,492	14,652	89,537	83,257	45,678
15.	80,407	93,607	45,978	58,143	54,623
16.	45,109	84,762	76,354	29,761	59,278
17.	72,033	43,958	98,123	45,374	66,495
18.	58,904	80,490	48,543	67,653	23,718
19.	60,406	72,683	76,879	48,937	89,395
20.	59,607	47,863	94,375	59,851	71,468
21.	65,342	86,213	76,326	61,987	45,312

NOTE. — Many hundred examples in addition can be assigned from this lesson, having as many figures in each column as are desired. Each pupil in the class can be given 10 or more numbers, each example different from any examples assigned to any other pupil.

In *A* add from 1 to 10; from 2 to 11; from 3 to 12, etc.

LESSON 68.

MULTIPLICATION OR DIVISION.

	A	*B*		*C*	*D*
1.	25,569	46	2.	34,689	821
3.	94,727	37	4.	56,983	246
5.	39,090	75	6.	59,625	355
7.	46,796	92	8.	83,765	506
9.	57,692	15	10.	90,557	698
11.	48,123	24	12.	84,398	404
13.	57,633	76	14.	60,090	695
15.	47,329	33	16.	25,689	487
17.	69,964	84	18.	63,009	921
19.	87,329	97	20.	39,184	947
21.	59,698	89	22.	84,692	465
23.	54,327	32	24.	50,490	407
25.	48,692	67	26.	20,048	822
27.	37,846	57	28.	29,834	374
29.	89,899	39	30.	87,527	928
31.	72,564	74	32.	38,243	938
33.	64,598	47	34.	64,855	657
35.	79,324	66	36.	23,467	586
37.	68,640	82	38.	26,948	234
39.	89,452	55	40.	89,456	714
41.	29,457	69	42.	47,309	483
43.	38,729	48	44.	67,751	189
45.	47,654	37	46.	83,124	507
47.	83,124	43	48.	34,573	832
49.	37,595	72	50.	27,353	729

NOTE. — If pupils at this point do not need this mechanical work, omit th lesson. Fifty examples are given in multiplication, and as many in division.

1. I bought 12¾ lb. of coffee at 28¢ a pound, and twice as many pounds at 24¢ a pound. How much change should I receive from a $10 bill?

2. A dealer mixed 2½ lb. of tea that cost 32¢ a pound with 1½ pounds that cost 40¢ a pound. How much is the mixture worth? How much is one pound of the mixed tea worth?

3. A farmer had 7 bu. of potatoes. He used 2 bu. 3 pk. for seed. What is the remainder worth at 20¢ a peck?

4. Find the cost of:

a. 208 sheep @ $4.65. *b.* 984 bu. onions @ $1.09.

c. 486 bu. wheat @ $1.04. *d.* 809 tons hay @ $11.45.

5. If 285 sacks of flour cost $313.50, how much will 50 sacks of the same kind cost?

6. How many square yards in a floor 24 ft. long and 18 ft. wide?

7. Find ⅔ of 7,839, and take it from 6,070.

8. How many cubic feet in 1,404 cu. yd.? How many cubic yards in 1,404 cubic feet?

9. How many square rods in 28 acres?

10. John bought a kite string 144 yd. long. If the kite broke away with ¾ of the string, how many feet of the string had he left?

11. How many tons of coal can be bought for $84, when 6 tons cost $24?

12. If ⅝ of a barrel cost $2.25, what will 9 bbl. cost?

13. In how many days will 8 men build a house, if 14 men can build it in 82 days?

14. What is the interest of $124.50 for 4 mo. 12 da.?

15. What is the interest of $248 for 3 mo. 18 da.?

16. What is the interest of $256 for 1 yr. 5 mo. 12 da.?

17. A field of 15 acres yielded 16.5 bu. of wheat to the acre. The labor and seed cost $186.50, and the wheat brought $1.05 a bushel. How much profit was made from the field?

ORAL.

1. Find the interest of $100 for 6 mo. For 1 yr. For 6 days. For 1 yr. 2 mo. 12 days.

2. 2 in. is how many times $\frac{1}{2}$ in.?

3. How many $\frac{1}{8}$ in. in 1 in.? In 3 in.?

4. What is $\frac{1}{2}$ of $\frac{1}{2}$ in.? $\frac{1}{2}$ of $\frac{1}{4}$ in.? $\frac{1}{2}$ of $\frac{1}{8}$ in.?

5. What part of an inch is 2 times $\frac{1}{3}$ in.? 2 times $\frac{1}{8}$ in.?

6. What part of an inch is 4 times $\frac{1}{4}$ in. $4 \times \frac{1}{8}$ in.? $4 \times \frac{1}{16}$?

7. Find $\frac{1}{8}$ of $\frac{1}{2}$ in. $\frac{1}{2}$ of $\frac{1}{8}$ in.

8. What is $\frac{1}{3}$ of 2 in.? $\frac{1}{8}$ of 2 in.?

9. Nellie had a half holiday (6 hours) to spend. She spent $\frac{1}{3}$ of that time with a sick friend. What part of the day did she spend with her friend? How many hours?

10. Make a problem to find the area of a square.

11. Make a problem to find the surface of a square pyramid.

12. How many sides has a pentagonal pyramid? An octagonal?

13. Make a problem to find cost of one article.

14. Make a problem to find interest.

15. Make a problem to find per cent of gain.

16. A farmer sold $\frac{3}{7}$ of his sheep, and the dogs killed $\frac{1}{7}$. How many sheep had he at first, if he had 30 sheep left?

17. A, B, and C bought some land. A paid $\frac{5}{12}$ of the amount, B $\frac{4}{12}$, and C $33. What did the land cost?

18. George and Henry bought a quantity of paper. George paid $1.50, and Henry the rest. If Henry paid $\frac{3}{5}$ of the whole, how much did both pay?

19. I bought some corn, and fed $\frac{5}{8}$ of it to my horse. If I have 48 bu. left, how many bushels did I buy?

20. How many cubic feet in a wheat bin 10 ft. by 8 ft. by 7 ft.?

21. 72 is $\frac{3}{4}$ of what number? $\frac{5}{8}$ of what number?

22. How many acres of land in a lot 20 rd. long and 16 rd. wide?

1. Write all the numbers between 1 and 11 that cannot be divided by any other numbers except themselves and 1.

2. What is a prime number? A prime number is a number that cannot be divided by other numbers except itself and 1.

3. Write all the numbers between 1 and 11 that can be divided by other numbers besides themselves and 1.

4. What is a composite number? A composite number is a number that can be divided by other numbers besides itself and 1.

5. Why is 6 a composite number? What numbers multiplied together make 6?

6. 3 and 2 are called factors of 6. A factor is a number that exactly divides another number.

7. Write all the prime numbers from 1 to 50.

8. Write all the composite numbers from 1 to 50.

9. Can prime numbers have any factors? If not, why not?

10. Are 4 and 3 factors of 12? Are 4 and 3 prime factors of 12?

11. Are 3 and 5 prime factors of 15?

12. A number is exactly divisible:

By 2, if its units figure is divisible by 2.
By 3, if the sum of the digits is divisible by 3.
By 4, if its tens and units are together divisible by 4.
By 5, if the units figure is 5 or 0.
By 6, if it is divisible by 2 and 3.
By 8, if the last three figures are divisible by 8.
By 9, if the sum of its digits is divisible by 9.

13. Find the prime factors of 210.

$$\begin{array}{r} 2\,)\,210 \\ 3\,)\,105 \\ 5\,)\,35 \\ 7 \end{array}$$

$2 \times 3 \times 5 \times 7$

What prime number will divide 210? Divide by 2. What is the quotient? What prime number will divide 105? Dividing by 3, what is the quotient? What prime number will divide 35? and what is the quotient? Make a list of your divisors and last quotient. These are the prime factors of 210.

14. Find the prime factors of:

42 100 200 625 1,000

1. Find the prime factors of:

60	132	450	1,320
72	175	800	1,600

2. Find the prime factors of:

8,424	8,364	1,682	7,563
4,284	7,698	2,585	2,112

3. Find the prime factors of:

1,884	1,710	1,161	1,020
4,129	1,121	2,500	1,001

4. Find the prime factors of:

2,465	6,552	8,192	6,660
3,003	7,826	6,561	2,448

5. Find the prime factors of:

4,158	6,006	3,125	8,225
3,150	5,324	2,475	9,936

6. Find the prime factors of;

3,675	3,825	1,935	9,576
2,310	5,324	1,800	5,075

7. At $6.25 a ton, how much coal will pay for 37½ tons of hay at $12.50 a ton?

8. A man lost $1,275 on a farm, which he sold for $12,525. How much would he have received for it if he had sold it at a profit of $2,750?

9. How many square inches of paper will it take to cover the sides and top of a box 14 in. long, 9 in. wide, and 8 in. high?

10. How many cubic inches are there in a rectangular block of marble 4 ft. long and 6 in. square at the ends?

11. If the divisor is $59, the quotient $284, and the remainder $28, what is the dividend?

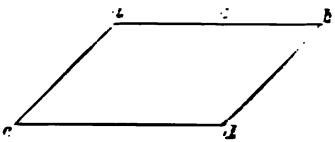
12. The sum of two numbers is 138,457, and one of them is 48,589. What is the other number?

13. Bought land at $12 an acre, paying $5,160 for it, and sold it at $16 an acre.

1. This is the plan of a garden, scale ; in. = 2' in. How many yards of fencing will it take to inclose it?

2. How much will it cost at 20¢ a square foot, to make a walk 4 ft. wide all around the inside?

3. What is a figure like this called? Why? What line represents its base? Its altitude?



4. Cut out of paper a parallelogram whose base is 3 in. and altitude 1 in. Can you turn this parallelogram into a rectangle? Cut on the dotted line *dc*. Place *ebd* so that *bd* shall coincide with *a*. How do the base and altitude of the rectangle compare with the base and altitude of the parallelogram?

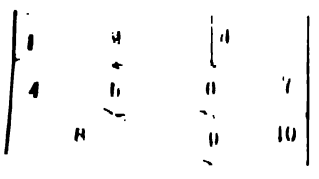
5. How then can you find the area of a parallelogram?

6. If this parallelogram is drawn to a scale of ½ in. to 10 ft. find its area.

7. Find the square feet in a rectangular piece of land in the form of a parallelogram which is 120 ft. long, and has an altitude of 40 ft.

8. A floor is 16 ft. long and 12 ft. wide has a painted border all around it 4 ft. deep. How many square feet in the unpainted part? In the painted part?

Note. Turn each trapezoid into a rectangle and a triangle before finding the area.



9. In this figure how many parallelograms can you see? Trapezoids? Triangles? Scale ¼ in. to 5 ft., find the area of the whole rectangle. Find the area of each of the 10 forms. Compare the sum of their areas with the area of the rectangle.

ORAL.

1. Make and perform an example to illustrate Interest.

2. Make and perform an example to illustrate Addition of Fractions.

3. Make and perform an example illustrating how to find selling price, when cost and loss per cent are given.

4. Make and perform an example illustrating how to find the sum of three given numbers.

5. Make and perform an example illustrating how to find the area of a rectangle.

6. Divide $\frac{4}{7}$ by 4; $\frac{11}{12}$ by 5; $\frac{9}{10}$ by 3; $\frac{8}{9}$ by 2; $\frac{6}{7}$ by 3.

7. Divide $\frac{6}{8}$ by 3; $\frac{4}{5}$ by 2; $\frac{4}{7}$ by 2; $\frac{10}{15}$ by 5; $\frac{12}{16}$ by 3.

8. Divide $\frac{1}{2}$ by $\frac{1}{6}$; $\frac{1}{8}$ by $\frac{1}{2}$; $\frac{2}{3}$ by $\frac{1}{6}$; $\frac{3}{7}$ by $\frac{1}{2}$.

9. Divide $\frac{1}{5}$ by $\frac{2}{7}$; $1\frac{1}{2}$ by $\frac{1}{3}$; $3\frac{1}{3}$ by $\frac{1}{4}$; $4\frac{1}{3}$ by $\frac{1}{6}$; $\frac{1}{6}$ by $4\frac{1}{3}$.

10. Reduce to mixed numbers:

$\frac{18}{4}$, $\frac{51}{8}$, $\frac{17}{5}$, $\frac{19}{7}$, $\frac{56}{11}$, $\frac{47}{9}$, $\frac{82}{3}$, $\frac{97}{10}$, $\frac{63}{7}$, $\frac{75}{6}$.

11. $\frac{2}{3}$ of 60 is $\frac{4}{5}$ of what number?

12. If one man can build a wall in $8\frac{1}{3}$ days, how long will it take 11 men to build it?

13. At \$6 a barrel, what will $6\frac{2}{3}$ bbl. of flour cost?

14. A man sold a cow for \$35, which was $\frac{5}{8}$ of what she cost. What did she cost?

15. If $\frac{1}{4}$ of a ton of hay cost \$5, what will 8 tons cost?

16. If 2 tons of hay cost \$40, what will $\frac{3}{4}$ of a ton cost?

17. If I own $\frac{3}{8}$ of a farm, and sell $\frac{1}{3}$ of my share, how much have I left?

18. What part of 6 is 1? 3 is what part of 6? 5 is what part of 6?

19. What part of $\frac{5}{8}$ is $\frac{3}{4}$?

20. If $\frac{3}{14}$ of a pole is standing in mud, $\frac{3}{7}$ in water, and 15 ft. above water, how long is the pole?

21. How many oranges at 4¢ each must be given for 12 lemons at 3¢ each?

LESSON 76.

1. A quadrilateral is a plane figure having four sides.

2. A Parallelogram is a quadrilateral whose opposite sides are parallel.

3. A Trapezoid is a quadrilateral two of whose sides are parallel.

4. A Trapezium is a quadrilateral none of whose sides are parallel.

5. A Rhombus is an oblique and equilateral parallelogram.

6. A Rhomboid is an oblique but not equilateral parallelogram.

7. How many square feet are there in a parallelogram whose base is 3 ft. 4 in., and height 1 ft. 6 in.?

8. What is the area of a triangle whose base is 20 ft., and height 10 ft. 4 in.?

9. In the Yosemite valley is the stump of a tree 35 ft. in diameter. What is its circumference? How many persons can stand on the top, if you allow 3 square feet to a person?

10. How many square feet in the surface of a four-sided pyramidal roof, whose slant height is 18 ft., and each side of its base 20 ft.?

11. How many cubic inches are there in a prism whose base is 8 in. square, and whose height is 7 in.?

12. Find the square inches in the entire surface of this prism.

13. If the radius of a circle is 14 ft., what is its circumference?

14. My wood-house is 20 ft. long, 18 ft. wide, and 10 ft. high. How many cords of wood can be piled in it?

15. A house is 36 ft. by 40 ft., with 20 ft. posts. The altitude of the gable end is 15 ft. The rafters are 24 ft. in length. The roof projects 2 ft. beyond the end of the house at both gables. Find the square feet of boards needed to cover this house.

16. Find the cost of fencing a field 80 rd. long, 36 rd. wide, at 65¢ a rod.

1. A grocer bought 2,555 pounds of sugar at 6¢ a pound; he sold 1,560 pounds at 8¢ a pound, and the remainder at 5¢ a pound.

2. If I sell 483 acres of land at $6 more an acre than it cost, and 275 acres at $8 less an acre than it cost, do I gain or lose? and how much?

3. A and B together own $698, and B owns $60 more than A. How much money does each own?

4. A man bought 45 bbl. of flour at $6 a barrel. Three barrels were spoiled. For how much a barrel must he sell the remainder in order to gain $74 on the whole cost?

5. A man sold 16 tons of hay at $17.50 a ton. How many barrels of flour at $7 a barrel can he buy with the money?

6. A man bought 600 bbl. of flour at $6.50 a barrel, and sold 200 bbl. at $5.50 a barrel, and 400 bbl. at $8 a barrel. How much did he gain?

7. Change to whole or mixed numbers:

$\frac{27}{3}$, $\frac{105}{7}$, $\frac{144}{18}$, $\frac{177}{16}$, $\frac{135}{12}$, $\frac{214}{17}$, $\frac{116}{9}$.

8. A man sold 4 rolls of paper. The first contained 17½ yd., the second 21½ yd., the third 14½ yd., and the fourth 14⅞ yd. How many yards were there in all?

9. What is the cost of 25½ lb. of mutton at 17½¢ a pound?

10. What are the prime factors of:

78? 104? 156? 144? 1,116? 648? 36?

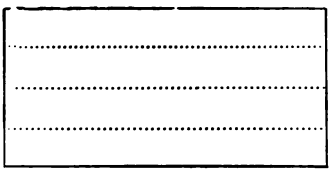
11. Arrange in bill form: J. Smith sold K. J. Johnson, Jan. 14, 1897, 16 bbl. flour @ $6.25; 14 bbl. flour @ $6.75; 20 bbl. cornmeal @ $2.65 a barrel. Jan. 21, he bought of him 50 bu. wheat @ $.93; 61 bu. corn @ $.65, and paid the balance in cash.

12. How many dozen eggs at 2¢ each can be bought for $14.40?

13. How many score in 270 dozen?

14. How many sheets in 600 reams?

CARPETING ROOMS.



1. This diagram represents a room 24 ft. long and 12 ft. wide. Suppose the carpet is 1 yd. wide, how many breadths will it take to cover the room? How long will each breadth be? How long will all the breadths be?

2. How do you find the number of breadths needed in a room when the breadths run lengthwise? When they run widthwise?

NOTE. — Be careful that the width of the carpet and the width of the room are of the same denomination.

3. If a room is 15 ft. wide and 20 ft. long, and the carpet 3 ft. wide, how many breadths of carpet will it take when they run lengthwise? How many yards will it take?

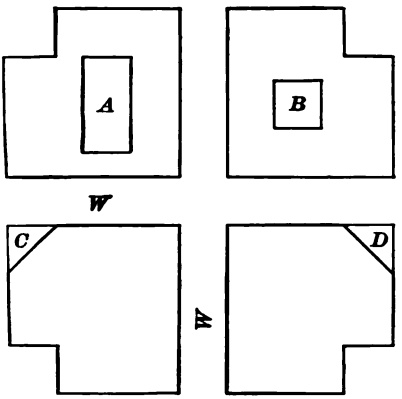
In the following examples let the breadths run lengthwise, the usual way, and find the number of yards of carpeting required for:

4. A room 12 ft. by 18 ft.. Carpet 1 yd. wide.
5. A room 15 ft. by 17 ft. Carpet 1 yd. wide.
6. A room 15 ft. by 18 ft. Carpet 1 yd. wide.
7. A room 12 ft. by 15 ft. Carpet $\frac{3}{4}$ yd. wide.
8. A room 18 ft. by 21 ft. Carpet $\frac{2}{3}$ yd. wide.
9. A room 20 ft. by 30 ft. Carpet $\frac{3}{4}$ yd. wide.

NOTE. — In buying carpets breadths are not split; it is necessary to buy a full breadth and turn a part under.

10. A room 21 ft. by 7 ft. Carpet 1 yd. wide.
11. A room 11 ft. by 16 ft. Carpet 1 yd. wide.
12. A room 16 ft. 6 in. by 20 ft. 4 in. Carpet 1 yd. wide.
13. A room 15 ft. 4 in. by 18 ft. 6 in. Carpet $\frac{3}{4}$ yd. wide.

NOTE. — In this lesson no allowance is made for waste in matching patterns. That point is brought out later.



This diagram represents a park. Scale ¼ in. to 10 ft. *A*, *B*, *C*, and *D* are flower-beds. *W*, *W*, are walks.

1. Find the area of the flower-beds, and the area of the two walks. Find the area of the lawn, which is all the rest of the figure.

2. At 12¢ a square foot, find the cost of covering the walks with gravel.

3. Find the number of cubic yards of gravel that it will take to raise the walks six inches.

4. If you receive 10¢ an hour for weeding the flower-beds, and can weed 10 sq. ft. in 15 min., how much will you receive for weeding each flower-bed? For weeding all the beds?

5. If you receive the same pay for cutting the grass on the lawn, and can cut 5,000 sq. ft. in 30 min., how much will you receive for cutting the grass?

6. How many geranium plants set one foot apart, and one foot from the sides of the bed, will cover *A*?

7. How many pansy plants set 6 in. apart will it take to make a border for *B*?

8. The area of the walks is what per cent of the area of the whole park?

9. The area of the flower-beds is what per cent of the area of the walks?

10. The area of *B* is what per cent of the area of *A*? Of all the flower-beds?

11. The area of *C* is what per cent of the area of *A*? Of *B*?

12. If the jogs at the four corners were added to the park, what per cent would the area of the park be increased?

ORAL.

1. One pint is what per cent of a quart?
2. One quart is what per cent of a gallon?
3. One ounce is what per cent of a pound?
4. One gill is what per cent of a pint?
5. One gill is what per cent of a quart?
6. One gill is what per cent of a gallon?
7. One pint is what per cent of a peck?
8. One inch is what per cent of a foot?
9. One foot is what per cent of a yard?
10. One and one-half feet are what per cent of a yard?
11. One peck is what per cent of a bushel?
12. One dozen is what per cent of a gross?
13. One quire of paper is what per cent of a ream?
14. One pencil is what per cent of a dozen pencils?
15. One year is what per cent of a score of years?
16. One day is what per cent of a week?
17. One month is what per cent of a year?
18. A nickel is what per cent of a dime?
19. One nickel is what per cent of a quarter?
20. One day is what per cent of the school days in a week?
21. One month is what per cent of a year?
22. Substitute two for one in each of the questions in this lesson, and solve.
23. One-third of an apple is one-third per cent of my apples. How many apples have I?
24. One-fifth of an apple is one per cent of all my apples. How many apples have I?
25. An agent collected a debt of $200, and kept 5% for doing the work. How much money did he keep? What did he call the money kept in this way?
26. When $\frac{1}{4}$ of the cost of an article is gained, what per cent is gained?

1. Bought tea at $\$\frac{1}{2}$ a pound; sold it at $62\frac{1}{2}\not{c}$ a pound. What was gained on 25 pounds?

2. I bought 312 yd. of velvet at $\$1.33\frac{1}{3}$ a yard. Sold it at a gain of a dollar on a yard. What did I receive for it?

3. If I paid $\frac{3}{8}$ of a dollar each for 19 knives, and sold them for $87\frac{1}{2}\not{c}$ each, how much did I gain or lose?

4. At $\$1\frac{1}{4}$ a pair, how many pairs of gloves can I buy for $125?

5. Grace had $\$44\frac{3}{4}$ in the bank, and earned $\$9\frac{1}{6}$. If she spent $\$33\frac{1}{3}$ for clothing, how much had she left?

6. A man owned $\frac{1}{4}$ of a paper mill; he sold $\frac{3}{5}$ of his share for $26,320. How much was the whole mill worth?

7. If your father can earn $\$14\frac{2}{3}$ in 7 days, how much will he earn in 24 days?

8. If $7\frac{1}{2}$ lb. of cheese cost 90 cents, how many pounds can be bought for $1.10?

9. If you should gather $24\frac{1}{2}$ quarts of chestnuts, and sell $8\frac{2}{3}$ quarts, how many quarts would you have left?

10. If 250 men weave 625 yards of carpet in a certain time, how many yards will a hundred men weave?

11. If $87\frac{1}{2}$ bu. of wheat cost $78.75, what will $12\frac{1}{2}$ bu. cost?

12. A man bought 387 acres of land for $8,514, and divided it into 9 equal parts. What was the cost of each part?

13. An agent bought land at $34 an acre, and sold it for $40.50. What did he gain on 97 acres?

14. Bought 387 acres of land at $17 an acre, and sold it at $13 an acre. What was the loss?

15. If a whip factory in Westfield, employing 270 men, produces 9,000 whips in 36 days, how many men must be employed to do the same work in 12 days?

16. A grocer bought 8 chests of tea, each chest containing 48 lb., at $50\not{c}$ a pound. He sold it at $68\frac{1}{2}\not{c}$ a pound.

LESSON 42.

ORAL.

1. Add: $2\frac{1}{2}$ and $3\frac{1}{2}$; $4\frac{1}{3}$ and $7\frac{2}{3}$; $\frac{3}{4}$ and $2\frac{3}{4}$;
$1\frac{1}{2}$ and $3\frac{1}{2}$; $3\frac{1}{5}$ and $2\frac{3}{5}$; $\frac{4}{5}$ and $3\frac{4}{5}$;
$2\frac{1}{3}$ and $3\frac{2}{3}$; $4\frac{1}{6}$ and $5\frac{5}{6}$; $\frac{5}{6}$ and $2\frac{5}{6}$.

2. If a man walks $3\frac{1}{2}$ miles the first hour and $4\frac{1}{2}$ miles the second, how far does he walk in two hours?

3. What is the value of:

$\frac{1}{2} + \frac{1}{2}$; $\frac{1}{2} + \frac{1}{4}$; $\frac{1}{2} + \frac{1}{8}$; $\frac{1}{2} - \frac{1}{2}$; $\frac{1}{2} - \frac{1}{4}$; $\frac{1}{2} - \frac{1}{8}$;
$\frac{1}{4} + \frac{1}{4}$; $\frac{1}{4} + \frac{1}{8}$; $\frac{1}{4} - \frac{1}{4}$; $\frac{1}{4} - \frac{1}{8}$;
$\frac{1}{8} + \frac{1}{8}$; $\frac{1}{8} - \frac{1}{8}$; $\frac{1}{3} - \frac{1}{3}$; $\frac{1}{3} - \frac{1}{6}$.

4. I bought a sheep for $\$3\frac{1}{2}$, and sold it for $\$4\frac{1}{2}$.

5. William is 9½ years old, and Bessie is 8½ years. Both of the sum of their ages? How much older is Bessie than William?

6. Mr. Morton is 40 years old, and his daughter Eva is ¼ of his age. How old is Eva?

7. A man sold ½ of his sheep to one man, ¼ to another, and ⅛ to a third. How many had he at first?

8. Find the interest of $200 for 2 mo.
9. Find the interest of $300 for 4 mo.
10. Find the interest of $400 for 1 mo.
11. Find the interest of $500 for 5 mo.
12. Find the interest of $600 for 6 mo.
13. Find the interest of $700 for 7 mo.
14. Find the interest of $800 for 8 mo.
15. Find the interest of $900 for 9 mo.
16. Find the interest of $1000 for 10 mo.
17. Find the interest of $100 for 6 days.
18. Find the interest of $600 for 12 days.
19. Find the interest of $800 for 18 days.
20. Find the interest of $600 for 1 yr. 2 mo. 12 da.
21. Find the interest of $700 for 24 days.

ADDITION OF COMPOUND NUMBERS.

1. Add: 4 bu.
5 bu.
1 bu.
6 bu.
16 bu.

2. Add: 3 pk.
1 pk.
2 pk.
1 pk.
7 pk.

3. Add: 7 qt.
4 qt.
5 qt.
2 qt.
18 qt.

4. Add:

4 bu.	3 pk.	7 qt.
5 bu.	1 pk.	4 qt.
1 bu.	2 pk.	5 qt.
6 bu.	1 pk.	2 qt.
16 bu.	7 pk.	18 qt.
18 bu.	1 pk.	2 qt.

In the first three examples, we have three columns of concrete numbers to add. In the fourth example we have the same three columns arranged as parts of one compound number. Add as at first, and the result is 16 bu. 7 pk. 18 qt. Since 8 qt. make 1 pk., 18 qt. will make 2 pk. and 2 qt. remaining. Write the 2 qt. in the column of quarts, and unite the 2 pk. with the 7 pk., making 9 pk. Since 4 pk. make a bushel, 9 pk. will make 2 bu. and 1 pk. remaining. Write the 1 pk. in the column of pecks, and unite the 2 bu. with the 16 bu., making 18 bu.

NOTE. — Be careful in writing Compound Numbers that only those of the same denomination are in the same column.

5. Add: 18 gal. 3 qt.; 60 gal. 3 qt. 1 pt.; 61 gal. 3 qt.; 57 gal. 3 qt. 1 pt.

6. Add: 15 da. 23 hr. 55 min. 17 sec.; 13 da. 15 hr. 17 min. 38 sec.; 10 da. 23 hr. 42 min. 17 sec.; 16 da. 16 hr. 38 min. 47 sec.; 20 da. 52 min. 57 sec.

7.

mi.	rd.	ft.	in.
21	295	11	1
45	279	10	11
35	214	9	10
58	276	16	10
54	70	16	1

8.

Add bu.	pk.	qt.
85	3	7
9	2	5
98	0	6
2	3	1
15	2	4

9. Add: 21 bu. 3 pk. 7 qt. 1 pt.; 48 bu. 2 pk. 1 pt.; 28 bu 6 qt.; 75 bu. 1 pk. 5 qt. 1 pt.

1. A collector receives 6% on all collections. He collects $5,800. How much does he keep? How much does he pay his employer?

2. What is the area of a circle whose radius is 14 ft.?

3. What is the circumference of a circle whose diameter is 24.5 ft.?

4. What is the interest of $360 for 6 mo. 18 days at 6%?

5. If carpeting is 24 in. wide, how many breadths and how many yards of carpet will it take to cover a floor 14½ ft. long, 10½ ft. wide?

6. If 192 tons of coal cost $1,344, what will 51 tons cost?

7. If ⅛ of an acre of land is worth $25, what are 17½ acres worth?

8. In how many days can 90 men dig a ditch that 45 men can dig in 540 days?

9. At $3.25 a cord, find the value of a pile of wood 320 ft. long, 4 ft. wide, 8 ft. high.

10. How many yards of carpeting ⅝ yd. wide are required to cover a floor 12 ft. by 18 ft.?

11. How many cubic feet in a rectangular block of stone 18 ft. long, 4 ft. wide, 2 ft. thick? How many square feet in its entire surface?

12. If 6 men can do a piece of work in 24½ days, in how many days can 4 men do it?

13. The product of two numbers or factors is .0625. One of the factors is 1.25, what is the other?

14. J. D. Furber bought of C. O. Clement, Nov. 1897, 2 dictionaries @ 90¢, 9 arithmetics @ 87¢, 24 spellers @ 20¢. Dec. 2 he bought 2 reams of paper @ $2.12, 3 doz. pencils @ 50¢, 12 slates @ 17¢. Dec. 20 he paid $20.

Make out an itemized bill, Dec. 1. A statement and bill, Jan. 1, 1898. Send a statement and letter demanding immediate payment, Jan. 15.

ORAL.

1. Henry gives \$1.25 for one ball, 50¢ each for two others. If he pays \$3 for 4 balls, what is the price of the fourth ball?

2. What will 16 hats cost at \$2¼ each?

3. A barrel of sugar contains 300 pounds. What is it worth at 5¢ a pound?

4. A farmer exchanged 7 sheep worth \$12 each for cows worth \$42 each. How many cows did he get?

5. If a man and his two sons earned \$90, and the man earned \$40, how much did each boy earn, if each earned the same amount?

6. If my house rent is \$360 a year, how much rent do I pay from Jan. 1 to July 1?

7. Three-fourths of a gallon of molasses cost 36 cents, what is the price of a gallon?

8. When butter is worth 16 cents a half pound, how much must I pay for 11 ounces?

9. How many pints are there in ⅞ of a gallon?

10. When eggs are worth 25¢ a dozen, how many eggs can be bought for \$3?

11. Give answers:

$42 \div 3$	14×6	$41 - 25$	$67 + 17$
$91 \div 7$	31×7	$90 - 19$	$14 + 36$
$56 \div 4$	90×8	$67 - 48$	$6 + 16$
$90 \div 6$	14×3	$80 - 15$	$13 + 29$

12. Give answers:

$60 \times 1\frac{1}{2}$	$\frac{4}{5}$ of 50	$800 \div 400$	$\frac{1}{2} - \frac{1}{8}$
$60 \times 1\frac{1}{3}$	$\frac{7}{8}$ of 80	$900 \div 300$	$\frac{1}{2} - \frac{1}{4}$
$60 \times 1\frac{1}{5}$	$\frac{2}{3}$ of 90	$800 \div 200$	$\frac{1}{3} - \frac{1}{8}$

13. Give answers:

$1{,}200 \div 600$	$2{,}800 \div 100$	35×100	234×100
$1{,}400 \div 700$	$3{,}600 \div 100$	74×100	678×100
$4{,}000 \div 800$	$4{,}500 \div 100$	43×100	345×100

1. The product of three numbers is 4,375; two of the numbers are 7 and 25. What is the third number?

2. The sum of four numbers is 4,987. Three of the numbers are 820, 1,529, 1,719. What is the fourth number?

3. How many square feet of lumber are needed to board the gable ends of a barn, each end being 24 ft. wide, and having a one-third pitch?

4. How many square feet in the surface of a spire in the form of an hexagonal pyramid whose slant height is 100 ft. and each side of the base 4 ft.?

5. Find the surface of a square pyramid whose slant height is 60 in., and one side of whose base is 24 in.

6. What is the entire surface of a block of stone in the form of a rectangular solid, 9 ft. by 4 ft. by 3 ft.? How many cubic ft. in the stone?

7. What is the circumference of a circle whose diameter is 14 ft.? 21 rods?

8. What is the diameter of a circle whose circumference is 22 ft.? 44 yards?

Find the area of the following triangles:

9. Base 15 ft., altitude 4 ft.

10. Base 120 ft., altitude 10 ft.

11. Base 48 ft., altitude 20 ft.

12. Base $12\frac{1}{2}$ ft., altitude $6\frac{1}{4}$ ft.

13. If 30 bu. of wheat cost $27.00, what is the cost of 45 bu. at the same price?

14. What is the interest of $630.50 for 6 mo. 12 da. at 6%?

15. What is the interest of $680.75 for 1 yr. 11 mo. 18 da. at 6%?

16. I sold 640 acres of land at $18 an acre. I kept 5% as my commission. What was my commission?

17. If 28 men can grade a road in 72 days, how long will it take 36 men to do $\frac{1}{3}$ of the work?

1. Divide $3\frac{3}{4}$ by $1\frac{1}{3}$; $17\frac{7}{11}$ by $5\frac{5}{8}$; $9\frac{3}{8}$ by $4\frac{1}{2}$; $6\frac{3}{5}$ by $8\frac{2}{3}$; $10\frac{2}{7}$ by $8\frac{1}{4}$; $5\frac{1}{2}$ by $8\frac{1}{4}$.

2. Divide:

a. $\frac{1}{2}\frac{7}{1}$ by $\frac{3}{7}$; $1\frac{1}{3}$ by $\frac{7}{10}$

b. $\frac{4}{7}$ by $\frac{8}{9}$; $\frac{1}{8}$ by $\frac{3}{4}\frac{1}{7}$

c. $\frac{8}{9}$ by $\frac{2}{3}$; $\frac{1}{1}\frac{1}{3}$ by $\frac{1}{8}$

d. $\frac{3}{8}$ by $\frac{1}{2}\frac{1}{7}$; $\frac{1}{8}$ by $\frac{7}{1}\frac{7}{2}$

3. If $2\frac{1}{2}$ bu. of oats will keep a horse 1 week, how long will $18\frac{3}{4}$ bu. keep him?

4. How many acres are there in 280 square rods?

5. One man has a field 80 rd. square; another has one 160 rd. long, by 40 rd. wide. How many acres has each?

6. At \$3 a rod, how much will it cost to fence each field?

7. How many square yards of plastering are there in a room 24 ft. long, 18 ft. wide, and 10 ft. high, if the doors and windows take out 175 square feet?

8. A man bought a piece of land 1,200 ft. long and 420 ft. wide at 25¢ a square foot. How much did it cost him?

9. If $10\frac{1}{2}$ lb. of sugar cost 44¢, what will $24\frac{3}{4}$ lb. cost?

10. What will it cost to carpet a room 24 ft. by 15 ft. with carpeting $\frac{3}{4}$ of a yard wide, at \$1.25 a yard, if the breadths run lengthwise?

11. A room is 35 ft. long and 17 ft. wide. How many yards of carpeting 27 in. wide will it take when the breadths run lengthwise? When they run across the room?

12. If a piece of land contains 10 A., and is 80 rd. long, how wide is it?

13. If a ton of coal occupies 40 cu. ft., what will it cost to fill a bin 12 ft. long, 6 ft. wide, and 5 ft. deep, with the coal at \$6.50 a ton?

14. Find the prime factors of 348, 450, 704, 945, 344, 590, 711.

15. Divide .08 by 1.600. 56.28 by .0056.

16. If one side of a square field is 5 rd. 6 ft. long, how many square feet are there in the field?

1. A man died whose property was worth $15,000. This was divided between his two sons. If the elder received $2,500 more than the younger, how much did each receive?

2. How many bushels of apples at $\frac{1}{8}$ of a dollar a bushel may be bought for $\frac{1}{4}$ of a dollar?

3. Divide $9\frac{1}{5}$ by $3\frac{1}{7}$, and $4\frac{3}{8}$ by $9\frac{1}{3}$.

4. Find the prime factors of 30, 48, and 56.

5. A schoolroom 28 ft. by 30 ft. by 12 ft. seats 72 children. How many cubic feet of air are there for each child?

6. What is the value of 4 piles of wood 150 ft. long, 4 ft. wide, and 8 ft. high, at $5.50 a cord?

7. How many square yards are there in the surface of a rectangular block that is 9 ft. long, $4\frac{1}{2}$ ft. wide, and 5 ft. high?

8. At $9 a cord, what is the cost of a load of wood 16 ft. long, 4 ft. wide, and 6 ft. 4 in. high?

9. How many square feet are there in a floor 15 ft. 8 in. wide, and 18 ft. 6 in. long?

10. Divide .144 by .004. 2.8 by .007.

11. Multiply .9642 by .009. 11.124 by .0002.

12. What will $1\frac{1}{2}$ miles of telegraph wire cost at $.025 a foot?

13. At $.14\frac{1}{2}$ a quart, what will 2 bushels of grass seed cost?

14. If a man can build $15\frac{3}{8}$ rd. of wall in $5\frac{1}{8}$ days, how much can he build in $2\frac{1}{4}$ days? $5\frac{1}{4}$ days?

15. If cloth is $16\frac{1}{2}$¢ a yard, how many quarts of berries at 11¢ a quart will pay for $2\frac{2}{3}$ yards?

16. Four men, A, B, C, and D, bought a mill. A paid for $\frac{1}{4}$ of it; B for $\frac{2}{5}$; C for $\frac{1}{6}$, and D the rest, $990. What did the mill cost?

17. At $1\frac{1}{4}$ a box, how many boxes of raisins can be bought for $9\frac{3}{7}$?

18. How many posts and how many rails will be required for a fence 156 ft. long, if the posts are set 12 ft. apart, and the fence is 5 rails high?

Find the selling price in the following:

	Cost.	Gain.	Cost.	Gain.
1.	$ 8	37½%	$ 8	62½%
2.	48	8⅓%	48	87½%
3.	392	25 %	392	45 %
4.	128	62½%	128	37½%
5.	75	33⅓%	75	80 %
6.	135	60 %	135	66⅔%
7.	150	20 %	150	33⅓%
8.	120	50 %	120	66⅔%
9.	240	87½%	240	60 %
10.	960	33⅓%	960	80 %
11.	960	83⅓%	548	87½%
12.	548	78 %	420	16⅔%

13. Find the entire surface measurement and cubic contents of a room 18 ft. × 12 ft. × 9 ft.

14. The distance round a square field is 20 rd. What is the field worth at 20¢ a square foot?

15. What is the area of a triangle whose base is 18 ft. 4 in., and altitude 12 ft. 10 in.?

16. My dining-room is 21 ft. long and 18 ft. wide. Find the area of the part uncovered, if in the center of the room there is a rug 18 ft. by 15 ft.

17. Multiply .0596 by .0008. 2.007 by .4096.

18. Divide 6.144 by .004. .128 by .0256.

19. Divide 3,462,706,614 by 567,843.

20. A man sold 60 bu. of oats at $.42; 40 bbl. of flour at $6.50; 56 bu. corn at $.58. Make out the bill, deducting 3% for cash.

21. If ⅝ of a field is worth $325, what is the whole field worth?

22. If ⅔ of a farm is worth $4,900, what is ⅗ of it worth?

23. If 40 men can do a piece of work in 10 hours, how many men can do it in 8 hours?

ORAL.

1. When 15 bu. of wheat will pay for 5 cd. of wood at $4 a cord, how much is the wheat a bushel?

2. If 7 plows can be bought for $77, how many can be bought for $44?

3. How many cents are there in 6 half-dimes? In 4 quarter-dollars?

4. To build a wall 800 bricks will be required. If I have 500 now, how many must I buy?

5. I have one piece of rope 10 ft. long, and another 2 yd. long. How long are both pieces?

6. A grocer buys butter at 20¢ a pound, and sells it for 25¢. What is his gain per cent? How much will he gain on 3 lb.?

7. 12 yd. are how many feet? 12 ft. are how many yards?

8. $\frac{2}{3}$ of 12 are ——? 12 is $\frac{2}{3}$ of ——?

9. $\frac{3}{4}$ of 12 are ——? 12 is $\frac{3}{4}$ of ——?

10. $\frac{2}{5}$ of 10 are ——? 10 is $\frac{2}{5}$ of ——?

11. $\frac{3}{5}$ of 20 are ——? 18 is $\frac{3}{5}$ of ——?

12. $\frac{2}{7}$ of 14 are ——? 14 is $\frac{2}{7}$ of ——?

13. $\frac{3}{8}$ of 24 are ——? 24 is $\frac{3}{8}$ of ——?

14. 3 ft. 4 in. equals —— in? 5 yd. 2 ft. equals —— ft.?

15. Henry lives $\frac{1}{2}$ mile from school. How many miles does he travel in a week in going to and from school, if he goes home to dinner?

16. Nellie's slate cost 15 cents, which was $\frac{3}{5}$ as much as her arithmetic cost. How much did the slate and arithmetic cost?

17. Mr. Smith had 4 acres of land. He sold 5 lots, each lot containing $\frac{2}{5}$ of an acre. How many acres had he then?

18. $\frac{2}{7}$ of 84 are ——? 12 is $\frac{2}{7}$ of ——?

19. $\frac{2}{5}$ of 90 are ——? 12 is $\frac{2}{5}$ of ——?

20. What is the interest of $200 for 2 yr. 8 mo. at 6%?

21. A house was insured for $4,000 at 1%. What was the cost of insuring?

1. Add 125 gal. 3 qt. 1 pt. 2 gi.; 75 gal. 2 qt. 1 pt. 3 gi.; 45 gal. 3 qt. 2 gi.; 39 gal. 1 qt. 1 pt.; 250 gal. 2 qt. 1 pt.

2. How much wood is there in three piles, of which the first contains 12 cd. 4 cd. ft. 7 cu. ft., the second 9 cd. 12 cu. ft., and the third 20 cd. 6 cd. ft. 5 cu. ft.?

3. Add 57 A. 25 sq. rd. 15 sq. yd.; 129 A. 18 sq. rd.; 37 A. 50 sq. rd. 13 sq. yd.; 75 A. 12 sq. yd.; 35 sq. rd. 10 sq. yd.

4. A schoolroom, 36 ft. long by 30 ft. wide and 18 ft. high, contains how many cubic feet of air?

5. At 22¢ a sq. yard, how much will it cost to plaster the above room, if 100 yards are deducted for doors and windows?

6. If in a boarding house they use 19$\frac{3}{8}$ lb. butter in 7$\frac{1}{3}$ days, how many pounds do they use in a day?

7. What is the cost of 486$\frac{3}{4}$ bu. corn at 62$\frac{1}{2}$¢ a bushel?

8. If $\frac{6}{11}$ of a ton of hay costs \$12$\frac{3}{8}$, what will 5$\frac{7}{8}$ tons cost?

9. From one hundred million, two hundred forty-seven thousand take one million four hundred nine.

10. A pole stands $\frac{1}{4}$ in the ground, $\frac{1}{3}$ in the water, and 15 ft. above the water. What is the length of the pole?

11. How many pounds of maple sugar, at 17$\frac{1}{2}$¢ a pound, will pay for 24$\frac{3}{5}$ lb. of coffee at 27$\frac{3}{4}$¢ a pound?

12. A pole is $\frac{1}{4}$ in the mud, $\frac{2}{3}$ in the water, and 14 ft. above the water. What is its length?

13. What are the contents of a floor 18$\frac{1}{4}$ ft. long and 16$\frac{3}{4}$ ft. wide?

14. Multiply forty-eight hundredths by sixty-four thousandths.

15. What is the cost of 18$\frac{3}{4}$ cords of wood at \$5$\frac{3}{8}$ a cord?

16. Perform the fifteenth example, using decimals.

17. What is the cost of 15.375 cords of wood at \$8.25 per cord?

18. Perform the seventeenth example, using common fractions.

ORAL.

The rate of interest in each of the following examples is 6%. Find the interest of:

1.	$100 for 1 yr.	$100 for 1 yr. 6 mo.
2.	$100 for 1 yr. 6 mo. 6 da.	$200 for 8 mo. 12 da.
3.	$200 for 10 mo. 18 da.	$200 for 1 yr. 5 mo.
4.	$200 for 1 yr. 7 mo. 24 da.	$300 for 4 mo.
5.	$300 for 9 mo.	$300 for 3 mo. 18 da.
6.	$400 for 6 mo. 12 da.	$400 for 1 yr. 3 mo. 18 da.
7.	$400 for 9 mo. 12 da.	$400 for 1 yr. 8 mo. 6 da.
8.	$500 for 7 mo.	$500 for 1 yr. 2 mo.
9.	$500 for 1 yr. 4 mo. 12 da.	$500 for 60 da.
10.	$500 for 36 da.	$600 for 1 yr. 1 mo. 6 da.
11.	$600 for 10 mo. 24 da.	$600 for 48 da.
12.	$600 for 1 yr. 2 mo. 12 da.	$1,000 for 9 mo.

13. Mr. Wood makes a profit of 21 cents on every bag of meal that he sells. What will be his profit on 4 bags?

14. Mr. H. gets 25 cents an hour for his work. How much will he get for 24 hours work? How many hours must he work to earn $15?

15. If a pound of sugar costs 9 cents, how many pounds can one buy for $2.34. For $0.36?

16. Samuel gets 9¢ an hour for weeding. How many hours will it take him to earn $1.35?

17. What is $\frac{1}{4}$ of 6? $\frac{1}{4}$ of 8? $\frac{1}{3}$ of 15?

18. What is $\frac{1}{7}$ of 14? $\frac{1}{8}$ of 32? $\frac{1}{5}$ of 18?

19. Change to improper fractions: $3\frac{1}{2}$, $1\frac{3}{4}$, $2\frac{1}{8}$, $4\frac{7}{8}$, $3\frac{3}{5}$.

20. Change to mixed numbers: $\frac{5}{2}$, $\frac{4}{3}$, $\frac{7}{4}$, $\frac{8}{3}$, $\frac{13}{8}$, $\frac{9}{7}$.

21. If you divide an inch into halves, and then divide each of these halves into 4 equal parts, what portion of an inch will each part be?

22. Multiply both numerator and denominator of $\frac{1}{2}$ by 2. What is the result? How does it compare with $\frac{1}{2}$?

1. How many tenths in $4\frac{1}{2}$ and $2\frac{3}{5}$?

2. A grocer had 80 bbl. of flour, and sold $\frac{3}{4}$ of it. What is the rest worth at $5.25 a barrel?

3. A fruit dealer had 7.5 doz. cocoanuts, and bought $8\frac{1}{2}$ doz. more. He sold $\frac{3}{5}$ of them for $9.45. How much was that for one?

4. If you buy apples at the rate of $\frac{1}{4}$ of a peck for 30 cents, and sell them at $.58 a peck, how much do you gain on a peck? On 5 bu. 3 pk.?

5. If .5 of a gallon of sirup cost 30 cents, what will $7\frac{1}{2}$ gallons cost?

6. A drover bought a car-load of cattle containing 32 head for $800, and sold them all for $1,120. What was the average gain on each?

7. If 4 oz. of tea cost 15 cents, how much can be bought for $21.60?

8. If I pay $2.70 for books, $1.65 for a hat, $13.50 for a suit of clothes, and $4.70 for a pair of shoes, how much shall I have left from a check of $27.85?

9. A farmer sold 210 bushels of wheat at $.96 a bushel, and bought hay at $14.40 per ton. How many tons did he buy? If he should sell the hay at $16.25, what would he gain?

10. Add 13 mi. 159 rd. 1 yd. 7 in.; 7 mi. 302 rd. 2 ft. 8 in.; 15 mi. 263 rd. 1 yd. 1 ft. 6 in.; 23 mi. 308 rd. 1 ft. 9 in.; 30 mi. 227 rd. 2 ft. 4 in.

11. At $1.75 a rod, what will be the cost of 1 mile of fence?

12. A man bought 140 acres of land for $7,560, and sold 86 acres of it at $75 an acre, and the remainder at cost. How much did he make?

13. A floor is 14 ft. by 15 ft. The carpet is $\frac{3}{4}$ yd. wide. Will it take a greater or a less number of yards if the breadths run lengthwise or widthwise? At $2.25 a yard what will be saved?

1. What is the circumference of a circular plot of ground 22 ft. in diameter?

2. What is the area of a room 15 ft. long, 9 ft. 6 in. wide?

3. The width of a house is 30 ft. and the height of the gable is 8 ft. What is the area of the gable?

4. What is the interest of \$76 for 30 da. at 6%?

5. What is the interest of \$96.50 for 36 da. at 6%?

6. A commission merchant sold \$2,350 worth of produce at a commission of 3%. What was his commission?

7. If I buy an acre of land for \$80, and sell it for \$90, what is the gain per cent?

8. What will it cost to paint an octagonal church spire whose slant height is 80 ft. and the sides of whose base are each 8 ft., at 5½ cents a square foot?

9. What is 27% of \$6,723?

10. If $\frac{5}{8}$ of a store is worth \$5,200, how much is $\frac{7}{8}$ of it worth?

11. Three piles of wood contain, respectively, 16 cd. 3 cu. ft.; 19 cd. 3 cu. ft.; 27 cd. 18 cu. ft.. How much wood in the three piles?

12. Change 187,620 min. to weeks.

13. Change 10 square rods, 3½ square feet, to square inches.

14. Change 8 bu. 2 pk. 2 qt. 1 pt. to pints.

15. A farmer bought 3,350 lb. of plaster at \$5.20 a ton. How much did it cost?

16. Divide: .3075 by .75. 18.1771 by 6.7.

17. Multiply: 25.75 by 5.6. 24.40 by .0008.

18. Reduce to decimals: $\frac{1}{40}$, $\frac{3}{16}$, $\frac{7}{8}$.

19. A roll of carpet containing 80 yd. cost \$64. If 48¾ yd. were sold at cost, what was received?

20. Reduce 63$\frac{5}{8}$ to an improper fraction.

21. If a man earn \$53¾ a week, how much can he earn in 52 weeks?

ORAL.

1. If it costs $\$\frac{1}{4}$ to carry a load 20 miles, how far can it be carried for $12?

2. A farmer agreed to give a laborer $6 for every 3 days' work. How much did he receive a week?

3. How much will be the wages for 1 year, if 4 months' wages amount to $48?

4. How much will 18 lb. of sugar cost, if 6 lb. cost 36¢?

5. If 4 oranges are worth 12 cents, how many oranges must be given for 6 pineapples, worth 12 cents each?

6. Six-ninths of 18 are how many times 6?

7. Two-thirds of 24 and three-fourths of 16 are how many times 7?

8. $\frac{1}{7}$ of 21 and $\frac{1}{8}$ of 40 are how many times 6?

9. 10 is $\frac{1}{3}$ of 20 times what number?

10. 20 is $\frac{1}{3}$ of 16 times what number?

11. $\frac{1}{3}$ of 12 is $\frac{1}{2}$ of what number?

12. $\frac{2}{3}$ of 12 is $\frac{1}{2}$ of what number?

13. $\frac{1}{7}$ of 21 is $\frac{3}{10}$ of what number?

14. $\frac{2}{3}$ of 36 is $\frac{1}{2}$ of what number?

15. $\frac{1}{4}$ of 8 is $\frac{1}{7}$ of what number?

16. At $12\frac{1}{2}$¢ a dozen, what will 4 dozen eggs cost?

17. At $\$6\frac{1}{4}$ what will 10 bbl. of flour cost?

18. How many are 9 times $10\frac{3}{4}$?

19. What will $9\frac{3}{4}$ bbl. vinegar cost at $4 a barrel?

20. If 1 gold pin costs $\$2\frac{1}{3}$, how much will 6 cost at the same rate?

21. What will $8\frac{3}{4}$ yd. of cord cost at 6¢ a yard?

22. If 2 qt. of beans cost 16 cents, what will 1 gill cost?

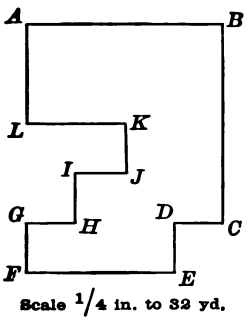
23. If 1 man can dig a ditch in 15 days, how long will it take 5 men?

24. An agent charged $12 for collecting a bill of $240. What per cent did he charge?

1. Multiply 864 by $16\frac{2}{3}$.
2. Divide 14,400 by $16\frac{2}{3}$.
3. Reduce to simplest form $1\frac{1}{8} \div \frac{3}{4}$.
4. Divide $\frac{3}{8}$ by $1\frac{7}{12}$.
5. Divide 125 by $3\frac{1}{7}$.
6. Multiply $1\frac{2}{3}$ by $\frac{9}{10}$. $\frac{12}{33}$ by $1\frac{1}{4}$.
7. Multiply 91 by $\frac{1}{13}$. 90 by $\frac{9}{20}$.
8. Multiply $8\frac{3}{8}$ by 24. $63\frac{1}{7}$ by 56.
9. From $55\frac{1}{2}$ take $38\frac{1}{8}$. From $54\frac{1}{4}$ take $21\frac{3}{7}$.
10. Add $12\frac{3}{4}$, $28\frac{5}{8}$, and $15\frac{3}{4}$.
11. Find the prime factors of 160, 330, 432, 325, 378.
12. What prime factors are common to 50 and 70?
13. What prime factors are common to 81 and 96?
14. A farmer exchanged 19 firkins of butter, each weighing 56 pounds, at 24¢ a pound, for 32 pieces of muslin, each piece containing 38 yd. What was the cost a yard?
15. Messrs. Jones & Russell bought of Frost & Son, Jan. 2, 15 yd. muslin @ 15¢; 23 yd. print @ 9¢. Jan. 15, 7 yd. cloth @ $4.25; 18 yd. linen @ 15¢. Feb. 7, 6 pair boots @ $5.75; 13 doz. buttons @ 22¢. Jan. 20, he paid cash $35.00. Feb. 15, he bought 15 lb. butter @ 33¢; 5 chickens @ 75¢.

Render an itemized bill Feb. 1. Render a statement and bill March 1.

16. If carpet is $\frac{3}{4}$ yd. wide, and costs 75¢ a yard, what will it cost to carpet a room 15 ft. wide and 19 ft. long, if the breadths run lengthwise?
17. Find the number of square feet of boards needed to roof and cover a house 24 ft. wide and 40 ft. long with 15 ft. posts. The roof has a one-fourth pitch, and the rafters are $14\frac{1}{2}$ ft. long.
18. A man owned 348 acres of land. He sold $\frac{3}{8}$ of it at $45 an acre. How much money did he receive, after paying 2% commission for selling?
19. Find the interest of $360 for 2 yr. 5 mo.



Scale 1/4 in. to 32 yd.

1. How many boards, each 12 ft. long, will it take to build a fence 6 boards high round this field?

2. How many posts will be needed for the fence if placed 6 ft. apart?

3. How many yards of wire will it take to put three strands of wire round the field? How many rods?

4. How far is it from *A* to *D* by way of *B*?

5. How far is it from *A* to *D* by way of *L*?

6. How far is it from *B* to *J* by way of *A*?

7. How far is it from *B* to *J* by way of *C*?

How far is it from:

8. *A* to *B*? *A* to *E*? *A* to *H*? *A* to *K*?
A to *C*? *A* to *F*? *A* to *I*? *A* to *L*?
A to *D*? *A* to *G*? *A* to *J*? *A* to *A*?

9. How far is it from *L* to *G*? How far would it be if you went in a straight line?

10. How far is it from *D* to *H*? How far in a straight line?

11. How many pickets 4 in. wide, and placed 2 in. apart, will it take to build a fence round the lot?

12. To find the area of this field, into how many rectangles would you divide it?

13. Find the square yards in the field.

14. Find the square feet in the field.

15. What is the lot worth at 22¢ a square foot?

16. What point is the same distance from *B* when measured in both directions on the lines?

17. If ¼ of an inch represents 40 rods, answer questions 4, 5, 6, 7, and 8.

18. If you can walk a mile in 15 min., how long will it take you to walk round the lot?

1. Add 18 sq. yd. 7 sq. ft. 123 sq. in.; 8 sq. ft. 140 sq. in.; 16 sq. yd. 116 sq. in.

2. A man owning .68 of an acre of land, sold .25 of what he owned. What part of an acre did he sell, and what part did he have left?

3. A shed 16 ft. square and 10 ft. high is filled with wood. How much is it worth at $3.75 a cord?

4. A man lost $12,000. If he had $\frac{1}{3}$ of his money left, how much had he at first?

5. Divide .0027 by .45.

6. At $1\frac{3}{5}$ a basket, how many baskets of peaches can be bought for $352?

7. At $3\frac{1}{4}$ a yard, how much will $58\frac{3}{4}$ yd. of velvet cost?

8. A has $975 more than B. If both have $7,647, how much has each?

9. A farmer has $\frac{2}{5}$ of his sheep in one field, $\frac{1}{3}$ of them in another, and the remainder, 16, in a third. How many sheep has he in all?

10. A floor containing 15 square yards is 9 ft. wide. How long is it?

11. Reduce $\frac{1}{4}\frac{3}{8}$, $\frac{8}{8}\frac{8}{8}$, $1\frac{7}{2}\frac{1}{5}$ to decimals.

12. Multiply .0078 by .017.

13. If the divisor is 675 and the quotient 289, what is the dividend?

14. From $72\frac{1}{2}$ take $28\frac{3}{5}$.

15. Find the difference between .042 and .0916.

16. Find the common prime factors of 48, 72, and 112.

17. Reduce .625, .25, and .0025 to common fractions.

18. The product of three numbers is 18,635, and two of them are 15 and 17. What is the other number?

19. The diameter of a circle is 21 ft. Find the circumference, then the area.

20. Multiply .0046 by .0017.

1. Add 18 cd. 113 cu. ft. 452 cu. in.; 25 cd. 97 cu. ft. 537 cu. in.; 73 cd. 137 cu. ft. 876 cu. in.; 12 cd. 113 cu. ft. 108 cu. in.; 63 cd. 47 cu. ft. 360 cu. in.

2. How many rails 12 ft. long will inclose a lot 50 rd. long and 28 rd. wide, the fence being 4 rails high?

3. Change 14 cd. 47 cu. ft. to cubic feet.

4. Change 5 T. 98 lb. 11 oz. to ounces.

5. Brown & Smith of Chicago sold to Mrs. Mary Kennedy, Dec. 28, 1898, the following: 121 yd. muslin @ 18½¢; 56 yd. cotton cloth @ 11½¢; 6¼ doz. handkerchiefs @ $2.25; 9 pairs gloves @ $1.25; 5½ doz. collars @ $3.50 a dozen. Make out her bill.

6. A coal-dealer received $18.00 for 5,760 lb. of coal. What was the price of a ton?

7. If your father burns 65,750 cu. ft. of gas in his store every year, what will his gas-bill be at $1.75 a thousand feet?

8. What will 9 bales of cotton cost, each bale containing 350 lb., at 16⅔¢ a pound?

9. Two men own 4,320 tons of coal. One man owns .62½ of it. How many tons do each own?

10. Divide .375 by .025.

11. A man gave 12¾ lb. of butter at 30¢ a pound for meat at 18¾¢ a pound. How many pounds of meat did he get?

12. If 3½ tons of hay cost $48, what will 8⅝ tons cost?

13. A father left his son all his property. The son invested ¾ of it in business and had $6,045 left. How much money did his father leave him?

14. If 5 acres of land cost $1,250, what ought I to pay for 17⅝ acres?

15. Find 16% of 200. 12% of 400.

16. Find 27% of 395. 25% of 750.

17. A man who had 500 bu. of wheat sold 40 bushels. What per cent of his wheat did he sell?

ORAL.

1. If I buy goods for \$8, and sell them for \$12, what per cent do I make?

2. If I buy for \$12, and sell for \$16, what per cent do I make?

3. If I buy for \$20, and sell for \$24, find my gain per cent.

4. If I buy for \$24, and sell for \$27, find my gain per cent.

5. Find my gain per cent, if I buy for \$36, and sell for \$39.

6. If I buy for \$16, and sell for \$20, what is my gain per cent?

7. If I buy goods for \$5, what must be my selling-price to gain 20%?

8. If I buy goods for \$6, and sell so as to gain $33\frac{1}{3}\%$, what is my selling-price?

9. What must be my selling-price in order to gain 25% on goods for which I paid \$8?

10. If I make $8\frac{1}{3}\%$ on goods, for which I paid \$12, what is my selling-price?

11. What must be my selling-price if I gain $66\frac{2}{3}\%$ on goods that cost me \$9?

12. For what must I sell goods that cost me \$14 so as to gain 50%?

13. How many cubic feet in a box 3 ft. long, $2\frac{1}{2}$ ft. wide, and 2 ft. deep?

14. How many feet are there in $\frac{1}{2}$ a rod?

15. If a stovepipe measures 22 in. in circumference, what is its diameter?

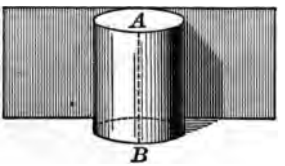
16. A box is 12 in. long, 12 in. wide, and 12 in. high. How many cubic feet does it contain?

17. How many inches in:

2 ft. 4 in.?	3 ft. 10 in.?	1 yd. 4 in.?
3 ft. 7 in.?	4 ft. 8 in.?	2 ft. 6 in.?

18. Find the quotient of 1.6 divided by .8.

TO FIND THE ENTIRE SURFACE OF A CYLINDER.



NOTE. — Have each pupil make a paper cylinder. Cut on line AB, and open it.

All cylinders referred to in this book are right cylinders.

1. After cutting your cylinder what form have you?

2. How do you find the surface of your rectangle?

3. The length and height of your rectangle were what dimensions of your cylinder?

4. Formulate a rule for finding the convex surface of a cylinder.

5. The ends of a cylinder have what form?

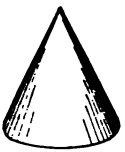
6. To find the entire surface of a cylinder, what must be added to the convex surface?

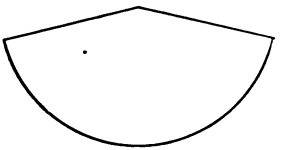
Find the convex surface of cylinders having the following dimensions:

7. Circumference 20 in., height 10 in.
8. Circumference 15 ft., height 15 ft.
9. Diameter 14 ft., height 20 ft.
10. Diameter 7 ft., height 15 ft.
11. Diameter 21 ft., height 22 ft.
12. Circumference 17 ft., height 19 ft.
13. Circumference 22 in., height 45 ft.
14. Circumference 18 in., height 21 ft.
15. Circumference 11 in., height 5 yd.

Find the entire surface of the following cylinders:

16. Circumference 44 ft., height 20 ft.
17. Circumference 22 ft., height 42 ft.
18. Circumference 66 ft., height 30 ft.
19. Diameter 14 in., height 2 ft.
20. Diameter 21 in., height 3 yd.





NOTE. — Make a paper cone. Cut it on a line running from any point in the circumference of the base to the apex. Open it. In this book all cones are supposed to be right circular cones.

1. What form have you?
2. The altitude of the triangle was what line in the cone?
3. The base of the triangle was what line in the cone?

NOTE. — If the pupils find difficulty in seeing that the surface of a cone is equal to one triangle, let them cut their cone into several triangles, and arrange them as in finding the area of circles.

4. Can you give a rule for finding the convex surface of a cone? Find the convex surfaces of cones having the following dimensions:

5. Circumference of base 10 ft. Slant height 20 ft.
6. Circumference of base 30 ft. Slant height 40 ft.
7. Circumference of base 16 ft. Slant height 32 ft.
8. Circumference of base 17 ft. Slant height 31 ft.
9. Diameter of base 7 ft. Slant height 16 ft.
10. Diameter of base 14 ft. Slant height 12 ft.
11. Diameter of base 7 ft. Slant height 24 ft.
12. Diameter of base 14 ft. Slant height 40 ft.
13. Diameter of base 21 ft. Slant height 27 ft.
14. Circumference of base 98 ft. Slant height 107 ft.
15. Circumference of base 75 ft. Slant height 113 ft.
16. Circumference of base 21 ft. Slant height 53 ft.
17. Circumference of base 19 ft. Slant height 43 ft.
18. Circumference of base 36 ft. Slant height 42 ft.
19. Diameter of base 14 ft. Slant height 45 ft.
20. Diameter of base 21 ft. Slant height 84 ft.
21. Diameter of base 35 in. Slant height 56 in.
22. Diameter of base 42 in. Slant height 72 in.

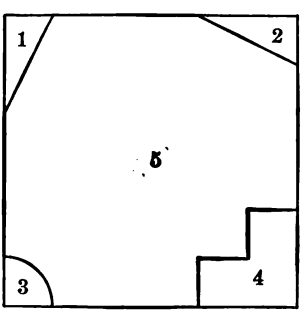
1. Find the convex surface of a pyramid whose base is a 6 ft. octagon, and slant height 75 ft.

2. Find the convex surface of a cone whose base has a circumference of 108 ft., and whose slant height is 240 ft.

3. Find the area of a circle when the radius is 7 ft.

4. Find the radius of a circle when the circumference is $3\frac{1}{7}$ ft.

5. Draw a 7-in. square. Inside, with a radius of $3\frac{1}{2}$ inches, draw a circle. Find the area of the part of the square that is not included in the circle.



6. This figure is drawn to a scale of $\frac{1}{4}$ in. to 7 ft. Find the area of each of the five divisions.

7. A house is 80 ft. long, 40 ft. wide, with 16 ft. posts. The roof has a one-fourth pitch. The rafters are 24 ft. long. Find the number of square feet of boards needed for the house, not including the floors.

8. Two men had \$7,583 divided between them. If one man received \$223 more than the other, how much did each receive?

9. Time sheet. 10 hours constitute a day's work. Deduct 10¢ an hour for lost time, and give 30¢ an hour for over time:

	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Wages.
A	10	8	10	$12\frac{1}{2}$	9	4	\$2.25
B	12	$9\frac{1}{2}$	10	$8\frac{1}{2}$	10	6	3.00
C	8	12	10	$9\frac{1}{2}$	11	7	2.00
D	10	8	11	10	10	6	2.50
E	9	10	7	9	10	8	3.00

Find the weekly wages of each person.

ORAL.

1. A lawyer received 5% commission for collecting a debt of $900. How many dollars did he receive?

2. George had 50 marbles, and lost 10% of them. How many did he have left?

3. If a man's salary is $2,400, and he spends 16⅔% of it, how many dollars will he spend? How many will he have left?

4. A man dug 96 bu. of potatoes for his neighbor, and agreed to take 12½% of the potatoes dug as his share. How many potatoes did he receive?

5. If 2.5 acres produce 50 bu. of wheat, what is the average an acre?

6. How many times is 4.5 contained in 9?

7. If 6⅔ lb. of grapes are worth 40 cents, how much is one pound worth?

8. If 4 pairs of gloves cost $4½, what is the cost of one pair?

9. How many sixths in ⅔ of an inch?

10. How many eighths in ⅛ of an inch?

11. Twelve times ⅛ inch equals what fraction?

12. Nellie had ⅞ of a yard of ribbon, and gave ¼ of a yard to her sister. How much had she left?

13. Reduce $\frac{3}{4}$ to 3ds. ½¾ to 4ths.

14. Reduce ⅔⅜ to 3ds. ¾⅜ to 8ths.

15. A wagon was sold for $56, which was ⅞ of its cost. What was the cost of the wagon?

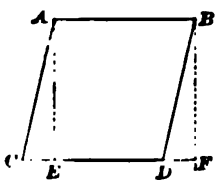
16. A man and his son work in a mill. The son earns ⅛ of the sum of their wages. The father earns $20 a week. How many dollars does his son earn?

17. What part of a gross is a dozen? What part is 6 dozen?

18. Make an example illustrating how to find the dividend when the divisor and quotient are given.

19. Illustrate: Given the price of an article, to find the cost of any number of them.

1. How many square feet in a rhombus whose sides are 14 ft. each, and the perpendicular distance between them 10½ ft.?



Cut from paper a rhombus, *ABCD*. Cut off the part *ACE*, and place in the position of *BDF*. What form have you now? If the side and altitude of the rhombus remain the side and altitude of the square, how do you find the area of a rhombus?

2. By a diagram illustrate the manner of changing a rhomboid into a rectangle. Formulate a rule for finding its area.

3. Find the area of five rhomboids, giving your own dimensions.

4. Divide twelve thousandths by three ten-thousandths.

5. If 5.75 lb. of tea cost $2.07, what will 43.675 lb. cost?

6. Make out the following bill, supplying names and date: 18,950 ft. boards @ $11 per M.; 18 M. shingles @ $5.75 per M.; 40 M. laths @ $4; 542 ft. cherry boards @ $.05 per foot; 11 M. clapboards @ $45 per M.; 4,750 ft. boards @ $18.50 per M.

7. In 11 miles, 141 rd., 9 ft., how many feet?

8. What will it cost to plaster a room 14 ft. long, 12 ft. wide, and 10 ft. high, at 30¢ a square yard?

9. How many cords of wood in a pile 72 ft. long, 4 ft. wide, and 10 ft. high?

10. How many bushels, pecks, and quarts in 6,759 quarts?

11. What will 175 lb. 8 oz. of sugar cost at 10¢ a pound?

12. Add: 5 gal. 3 qt. 1 pt. 2 gi.; 9 gal. 1 qt. 1 pt. 3 gi.; 7 gal. 3 qt. 1 pt. 2 gi.; 5 gal. 4 qt. 1 gi.

13. In one school there should be 480 pupils. If only 95% are present, how many are absent?

14. I had $640 yesterday. I have $96 to-day. What per cent of the money I had yesterday have I now?

15. A wholesale dealer lost 500 bbl. of apples, which was 40% of the number of barrels he had at first. How many has he now?

SURFACE MEASUREMENTS.

Find the entire surface of the following:

1. A rectangle, length 60 rd., width 45 rd.
2. A triangle, base 17 ft., altitude 22 ft.
3. A rhomboid, base 12 ft., altitude 15 ft.
4. A pyramid, base, a 9-foot hexagon, slant height, 23 ft. (Convex surface.)
5. A rectangular prism, base 15 ft. by 12 ft., and height 19 ft.
6. A cone, circumference 22 ft., slant height 68 ft.
7. A cone, diameter 21 ft., slant height 48 ft.
8. A pyramid, base a 20-ft. square, slant height 50 ft.
9. A cylinder, circumference 44 ft., height 60 ft.
10. A cylinder, diameter 14 ft., height 27 ft.
11. A house, 70 ft. long, 48 ft. wide, with 22 ft. posts. The roof has a one-fourth pitch, and the rafters are $28\frac{1}{2}$ ft.
12. An equilateral triangle, sides 6 ft. each, and a perpendicular line from one vertex to the opposite side, $5\frac{1}{2}$ ft.
13. A stovepipe, diameter 7 in., and length 40 ft.
14. A rhomboid, 6 ft. long, and width 3 ft.
15. A room 36 ft. by 24 ft. by 11 ft.
16. A room 25 ft. by $18\frac{1}{2}$ ft. by $9\frac{1}{2}$ ft.
17. A rectangular field 26.84 rd. long, and 12.18 rd. wide.
18. Find the number of yards of carpet needed for a room 18 ft. by 12 ft. 6 in. The carpet, which is $\frac{3}{4}$ yd. wide, should run the most economical way.
19. Find the square feet of boards needed to cover the roof and walls of a house 46 ft. long, 32 ft. wide, 40 ft. high to the ridge-pole, and 28 ft. high to the eaves, with rafters 20 ft. 6 in. long.
20. A room is 16 ft. by 12 ft. A rug covers the room, leaving a border all round 2 ft. in width. Find the area of the rug and of the border.

1. The wheel of my carriage is 42 in. in diameter. How far have I traveled when the wheel has made 1,430 revolutions?

2. How many eggs at 12½¢ a dozen must be given in exchange for 16¼ yd. of silk at $1.25 a yard?

3. A lot of land is 5 rd. long and 42½ ft. wide, and has round it a tight board fence 4 ft. high. Find the entire cost of the fence, if the boards cost $16 per M., painting 15¢ a square yard, and building 8¢ a square foot.

4. From a piece of cloth measuring 53½ yards, there were sold 45⅔ yd. What is the remnant worth at $2½ a yard?

5. How many paving stones 9 in. square will it take to pave a street 5 rd. long, and 30 ft. wide?

6. A field is 37 rd. long and 26 rd. wide. At 3¢ a yard, what will it cost to fence the field with 4 strands of barbed wire?

7. A man owns ⅜ of a mill, and sells ¼ of his share for $8,400. What is the whole mill worth?

8. I handed the grocer $5.00 to pay for 5 lb. of tea @ 62½¢, and 5½ lb. of crackers @ 9¢. Find my change.

9. Find change from $3.00 after buying 6 lb. starch @ 12½¢, and 3 lb. coffee @ 33⅓¢.

10. Oct. 18, 1898, Mr. J. Ross bought of Smith & White 28 bbl. flour @ $5.37½; 416 bu. corn @ 53¢; 215 bu. oats @ 40¢. Send his bill and a letter asking for immediate payment Nov. 15. Send him a receipt for $150 received Nov. 18. Send a statement Dec. 1.

11. If a gallon contains 231 cubic inches, how many gallons will a tank hold that is 18 ft. long, 15 ft. wide, and 6 ft. deep?

12. The perimeter of a rectangular lot is 260 ft. If the lot is 30 ft. wide, how long is it? What is its area?

13. Add fifteen thousandths; thirty-one hundredths; one hundred and twenty-nine thousandths; eighty-one ten-thousandths; three hundred, twenty-seven, and seven tenths.

1. A farmer raised 3,000 bu. of oats, and sold $8\frac{1}{3}\%$ of them. How many bushels had he left?

2. In one high school there are 240 pupils. 15% of this number are seniors, 25% are juniors, 30% are sophomores. How many belong to the freshman class?

3. A grocer had 3 hogsheads of molasses. The first contained 125 gal., the second 107 gal., the third 100 gal. He lost 10% by leakage, and sold 65%. What was the value of the remainder at 15¢ a quart?

4. If you bought 36 gal. of maple sirup for \$16.20, and sold it at 54¢ a gallon, what was the per cent of profit?

5. A father left his son \$6,000. He invested 25% of it in railroad stocks, 50% of it in business, and put the remainder in a bank.

6. Paid \$4,230.75 for a shipment of flour. I gained in selling it 24%.

7. A man who owned $\frac{3}{4}$ of a ship sold $\frac{4}{5}$ of his share for \$21,000. What was the value of the whole ship?

8. Divide 2,705,498 by 18; 32; 175; 344; 1,763.

9. $47\frac{1}{24} - 32\frac{5}{8}$. $28\frac{3}{81} - 13\frac{1}{3}$.

10. $8\frac{4}{7} \times 7\frac{1}{2}$. $5\frac{5}{8} \times 8\frac{3}{7}$. $4\frac{8}{9} \times 6\frac{1}{2}$.

11. $6\frac{1}{4} \div 5\frac{1}{2}$. $37\frac{1}{2} \div 16\frac{2}{3}$. $7\frac{1}{2} \div 3\frac{1}{3}$.

12. Simplify: $\frac{1\frac{1}{2}}{\frac{1}{2}}$. $\frac{3\frac{4}{5}}{1\frac{1}{10}}$. $\frac{8\frac{1}{2}}{7\frac{2}{3}}$.

13. A man's house rent is \$480 a year. This is $\frac{2}{5}$ of his salary. If he saves $\frac{1}{5}$ of his salary every year, how long will it take him to save \$2,304?

14. If you take 120 steps a minute, and each step is 24 inches long, how many miles can you walk in an hour? How long will it take you to walk from Holyoke to Springfield, a distance of 9 miles?

15. Divide 3.6486 by .00045.

16. Divide 43.7931 by 2.3049.

ORAL.

1. What will $5\frac{1}{2}$ qt. of plums cost at 4¢ a pint?

2. How much is a quart of beans worth, if a bushel is worth $1.60?

3. A boy bought a peck of chestnuts for 50 cents, and sold them at 8¢ a quart. How much did he make?

4. How many feet in a rod?

5. How many square yards in a floor 15 ft. long and 12 ft. wide?

6. How many square feet in a board 20 ft. long and $1\frac{1}{2}$ ft. wide?

7. How many quarts in $\frac{3}{8}$ of a bushel?

8. How many pints in $3\frac{3}{4}$ gal.?

9. How many ounces in $2\frac{1}{2}$ pounds?

10. A boy picked 3 pk. of cherries, and sold them at 5¢ a pint. How much did he receive?

11. What per cent of 125 is 25?

12. What per cent of 72 is 36?

13. What per cent of 320 is 32?

14. A man paid $80 for a horse, and sold it for 10% more than it cost. For how much did he sell it?

15. A man bought a horse for $80, and sold it for $88. What per cent did he gain?

16. For how much must butter that cost 20¢ a pound be sold to gain 10%?

17. A man sold velvet at $4 a yard, and lost 20%. What was the cost?

18. What is the interest of $1 for 24 da.? 18 da.? 12 da.?

19. What is the interest of $50 for 24 da.? 18 da.? 12 da.?

20. What is the interest of $1 for 2 mo. 18 da.? 4 mo. 24 da.? 3 mo. 6 da.?

21. What is the interest of $50 for 2 mo. 18 da.? 4 mo. 24 da.? 3 mo. 6 da.?

1. A rectangular lot 24 ft. long, 16 ft. wide, has a road 8 ft. wide extending round it on the outside. Find area of road.

2. What is the area of a circle whose diameter is 35 ft.? 42 ft.? 56 ft.?

3. What is the area of a circle whose circumference is 88 ft.? 3½ rd.?

4. Find the interest of $1,278 for 1 yr. 7 mo. 18 days at 6 per cent.

5. Find the entire surface of a cylinder whose circumference is 22 in., and whose altitude is 2 ft.

6. A cylindrical cistern is 18 ft. deep and 7 ft. in diameter. How much will it cost to cement the sides and bottom at 20¢ a square foot?

7. My garden is 36 ft. long and 24 ft. wide. It has a walk round the outside 1½ ft. wide. How many square feet in the walk? At 15¢ a running foot, what will it cost to inclose the garden?

8. The diameter of a circular fountain is 175 ft. How many yards of granite curbing are needed to inclose it? What is its area?

9. Add 2 bu. 3 pk.; 1 bu. 2 pk. 6 qt.; 3 pk. 7 qt.; 4 bu. 6 qt.

10. My lawn is 40 ft. by 30 ft. If a cubic yard makes a load, how many loads of loam did it take to cover the lawn 6 inches deep?

11. A man bought a horse for $150, and sold him so as to gain ⅗ of his cost. Find the selling-price.

12. Work the 11th example by percentage.

13. Divide 810.48 by 24.56. 97.524 by .1806.

14. What is the value of .8 acres of land at $145.50 an acre?

15. If ⅔ of a yard of cloth cost $4⅔, what will 2½ yards cost?

16. Find the sum of 2½, 5⅔, and 8⅔.

17. What number is 3½ less than 5⅔?

LESSON 112.

ORAL.

1. What will 3 five-cent stamps and 10 one-cent stamps cost?

2. What part of a bushel will it take to fill a four-quart measure 4 times?

3. The sum of two numbers is 76, and one of the numbers is 54. What is the other number?

4. What number must be taken from 42 to leave 28?

5. A girl practiced one hour and a quarter every day, and her sister 75 min. a day. Which one practiced the longer time?

6. 72 is how many more than 9 times 7?

7. What number must you put with each of the following numbers to make 40: 32? 26? 18? 25? 38? 20?

8. Give answers:

$33 \div 3$	$55 \div 5$	13×4	14×5
$64 \div 4$	$57 \div 3$	16×5	12×4
$48 \div 4$	$85 \div 5$	12×5	16×4

9. Give answers:

$32 - 10 - 8$	$85 - 10 - 7$	$73 - 10 - 6$
$73 - 10 - 7$	$72 - 10 - 6$	$47 - 10 - 8$
$65 - 10 - 6$	$56 - 10 - 8$	$61 - 10 - 6$
$44 - 10 - 8$	$95 - 10 - 8$	$76 - 10 - 8$

10. Give answers:

$92 - 10 - 3$	$55 - 10 - 8$	$95 - 10 - 8$
$58 - 10 - 3$	$64 - 10 - 5$	$83 - 10 - 8$
$38 - 10 - 7$	$76 - 10 - 5$	$58 - 10 - 5$
$97 - 10 - 6$	$49 - 10 - 4$	$87 - 10 - 5$
$79 - 10 - 6$	$65 - 10 - 4$	$96 - 10 - 3$

11. $\frac{1}{2}$ is what part of $\frac{3}{4}$? $\frac{1}{3}$ is what part of $\frac{2}{3}$?

12. $\frac{1}{4}$ is what part of $\frac{5}{12}$? $\frac{2}{5}$ is what part of $\frac{7}{10}$?

13. At $\$\frac{2}{3}$ a yard, how many yards of cloth can be bought for $\$\frac{2}{12}$?

14. At $\$\frac{1}{3}$ a peck, how many pecks of peaches can be bought for $\$2\frac{2}{3}$?

1. A man bought a pile of wood for $40\frac{1}{4}$. He estimated that he was paying $3.37\frac{1}{2}$ a cord. If true, how many cords were there?

2. A barrel holds $2\frac{1}{2}$ bu. At 34¢ a bushel, how many barrels of apples cost $13.60?

3. If your uncle owns a farm of 148 acres, valued at $67 an acre, and should exchange it for 21 cows at $36, and $8,250 in money, how much would he lose?

4. What is the price of 3 qt. of potatoes if 2 pk. 6 qt. cost $1.54?

5. A grocer paid $29.35 for a hogshead (63 gal.) of molasses, but 9 gallons leaked out. If he gained $6.29 on the hogshead, at what price a gallon did he sell it?

6. A real estate dealer bought a rectangular piece of land 160 rd. long and 120 rd. wide. He divided it into 4 equal building-lots, each lot as long as the piece of land was wide. At 1¢ a foot he fenced each lot with 4 strands of wire. Find the cost.

7. What will be the cost of 3,216 qt. of walnuts at $3.50 a bushel?

8. At 16¢ a gallon, what must I pay for 15 gal. 3 qt. 1 pt. of oil?

9. A man having $45\frac{3}{4}$, received $24\frac{9}{10}$ for work, and then paid out $25\frac{1}{4}$. How much money had he left?

10. Find the number of pounds of butter in 4 tubs weighing $23\frac{1}{3}$ lb., $24\frac{3}{8}$ lb., $31\frac{1}{8}$ lb., and $27\frac{3}{8}$ lb.

11. A. F. Pease bought of Smith & Forbes $17\frac{1}{2}$ yd. muslin @ 16¢; 42 yd. cotton cloth @ 8¢; 18 yd. silk @ $87\frac{1}{2}$¢; $9\frac{1}{2}$ yd. flannel @ 50¢; 18 yd. Canton flannel @ $27\frac{1}{2}$¢; 4 spools thread @ 5¢. Make out his bill.

12. A grocer sold 16 lb. 4 oz. cheese at $9\frac{3}{4}$¢ a pound.

13. What will $28\frac{1}{4}$ lb. rice cost, if $12\frac{1}{2}$ lb. cost $1\frac{1}{8}$?

14. Find the interest of $75.25 for 11 mo. 24 days.

1. Which has the greater convex surface, a cone having a slant height of 22 ft. and a base 21 ft. in diameter, or a pyramid having a slant height of 22 ft. and a base 16 ft. square?

2. What is the area of a circular pond with a radius of 700 ft.?

3. Find the area of a triangular piece of land having a base of 7.5 rd., with the vertex 4.7 rd. from the base.

4. If 26 acres of land cost $2,236, what will 435 acres cost?

5. Find the cost of 3,250 envelopes at $1.35 a thousand.

6. What number diminished by 40% of itself leaves a remainder of 240?

7. What number diminished by $\frac{1}{3}$ of itself leaves a remainder of 540?

8. If $\frac{2}{3}$ of a mill is worth $2,500, what is $\frac{1}{3}$ of it worth?

9. The following is a time sheet of a woolen mill. 8 hours are considered a day's work:

	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Wages.
A	8 hr.	$7\frac{1}{2}$ hr.	8 hr.	$7\frac{1}{2}$ hr.	8 hr.	8 hr.	$1.25
B	$7\frac{1}{2}$	$7\frac{1}{2}$	8	$7\frac{1}{2}$	$7\frac{1}{2}$	8	1.50
C	6	8	6	$7\frac{1}{2}$	6	5	1.75
D	4	$8\frac{1}{2}$	9	8	$7\frac{1}{2}$	6	1.40
E	8	6	$7\frac{1}{2}$	5	8	4	1.50

10. Nov. 5, 1897, Chas. Jenks buys of Clapp Brothers 1,425 ft. pine boards @ $27.50 per M.; 4,175 ft. hemlock @ $18.25 per M.; 3,650 ft. cedar posts @ $8.75 per C. Nov. 1 he buys 3,500 shingles @ $4.40 per M.; 9,275 pickets @ $5.75 per M. Dec. 10, he pays $125. Jan. 4, '98, he pays $75. Feb. 15, he pays the balance. Make out an itemized bill Dec. 1. Render a statement Jan. 1 and Feb. 1. Render a receipted statement Feb. 15.

11. Find the area in acres of a rectangular piece of land 84 rd. by 20 rd. Of one 70 rd. by 96 rd. Of one 48 rd. by 50 rd.

ORAL.

1. A horse traveled 24½ miles in 4 hours. What was his average rate an hour?

2. At $\frac{3}{4}$ a bushel, how many bushels of turnips can I buy for $4\frac{1}{2}$? For $9? For $7\frac{1}{4}$?

3. At $\frac{2}{3}$ a yard, how many yards of cloth can be bought for $4? $6\frac{2}{3}$? $9\frac{1}{3}$? $12?

4. How many cents in $\frac{3}{5}$? $\frac{4}{5}$? $\frac{5}{12}$?

5. At 12½¢ a yard, what will 8 yd. of cloth cost?

6. Divide $\frac{2}{3}$ of a pound of candy equally among 4 boys.

7. John had 20 cents, James had $\frac{4}{5}$ as much, and James' money was $\frac{1}{2}$ of William's. How much had William?

8. Multiply:

.6 by 10	6.4 by 10	.64 by 10
.06 by 10	.064 by 10	1.064 by 10
.03 by 100	.003 by 100	.034 by 100

9. If a note-book costs 5 cents, what part of a dollar will 10 note-books cost?

10. At .06 of a dollar a pound, what will 2.5 lb. cost? 50 lb.? 10 lb.?

11. If .2 of a pound of meat costs 4 cents, what will 1 pound cost? What will 4.5 lb. cost?

12. I bought 8 doz. oranges, and sold $\frac{1}{4}$ of them. How many had I left?

13. I bought 8 doz. oranges, and sold 25% of them. How many had I left?

14. I bought 8 doz. oranges, and sold .25 of them. How many had I left?

15. Using a scale of 1 inch for 20 feet, how long a line will represent 5 ft.? 30 ft.? 25 ft.? 40 ft.? 55 ft.?

16. If there are 21 sq. ft. in a table that is 3 ft. wide, how long is it?

17. Find the cost of 24 articles at 16⅔¢ each; $1.33⅓; 66⅔¢; $2.37½; $1.75.

LESSON 113

[illegible] wide extends to [illegible] 250 ft. to the east. [illegible] Find the area [illegible]

2. [illegible] length [illegible] window [illegible] the number of square [illegible]

3. [illegible]

4. [illegible] ft. long, 15 ft. [illegible]

5. [illegible]

6. [illegible] square feet.

7. [illegible]

8. [illegible] circumference, how [illegible] 9 rd. 2 yd. 2 ft.?

9. [illegible] 24 [illegible]

10. [illegible] pounds.

11. [illegible] pt. 2 gi. to gills.

12. [illegible] 1 pt. to pints.

13. [illegible] pieces of cloth cost, each piece containing [illegible] $1.80?

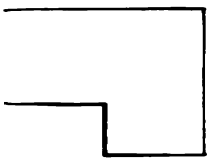
14. [illegible] dollars and thirty-six cents take two [illegible] seventy-three hundredths dollars.

[illegible] I lost $35. For how much [illegible]

[illegible] in a given time [illegible]

1. A dozen barrels of apples cost $21. For what price must I sell each barrel to gain 33⅓%?

2. How many yards of plastering in the walls and ceiling of a room 16 ft. long, 12½ ft. wide, 10 ft. high?



3. This diagram represents a cellar drawn to a scale of ¼ in. to 10 ft. How many loads must be removed in digging the cellar if it is 9 ft. deep, and a cubic yard is removed in a load?

4. Divide 6502.1 by 5.06.

5. A boy lost ⅛ of his money, lent ⅓ of the remainder, and spent ¼ of what was left. If he then had 360 cents, how many cents had he at first?

6. If a turkey weighing 10½ lb. cost $1.68, what will be the cost of 3 turkeys averaging 12½ lb.?

7. Cloth which cost $1.25 was sold for $1.37½. What was the gain per cent?

8. Find the interest on $450 for 1 yr. 9 mo. 12 da. at 6%.

9. Find the interest on $80.75 for 2 yr. 6 mo. 12 da. at 6%.

10. A man paid $48 for his harness, which is 80% of what he paid for his sleigh. What did he pay for both?

11. I bought a span of horses for $500, and in selling them I lost 6%. For what did I sell?

12. Suppose I had sold the span for 8% above cost, for what should I have sold them?

13. What is the least number of yards of carpet, ¾ of a yard wide, needed to carpet a floor 20 ft. by 17 ft.?

14. How many cords in a pile of wood 48 ft. long, 4 ft. wide, and 6½ ft. high?

15. If 1.25 acres of land are worth $87.50, what is the worth of 24.5 acres?

16. What will it cost to dig a cellar 45 ft. long, 32 ft. wide, and 6 ft. deep, at $0.27 a cubic yard?

1. In a public building a corridor 50 ft. wide extends to the north 250 ft., and then at right angles 250 ft. to the east. Draw a diagram of it $\frac{1}{8}$ of an inch to 25 ft. Find the area of the corridor.

2. With scale 1 inch to 12 ft., draw a diagram of a room 30 ft. long, 15 ft. wide, having on one side a bay window 6 ft. by 3 ft. If this room is $9\frac{1}{2}$ ft. high, find the number of square yards in the walls and ceiling.

3. Add: 12 bu. 2 pk. 5 qt. 1 pt.; 15 bu. 3 pk. 3 qt.; 29 bu. 2 pk. 1 pt.; 17 bu. 2 qt.

4. How many cubic feet of air in a room 19 ft. long, 16 ft. wide, and 9 ft. high?

5. Change 15 cd. to cubic feet.

6. Change 112 sq. rd. 5 sq. ft. to square feet.

7. Change 14 rd. 2 yd. 2 ft. to inches.

8. If a carriage wheel is 17 feet in circumference, how many times will it turn in going 4 mi. 96 rd. 2 yd. 2 ft.?

9. Change 97,124 lb. to tons.

10. Change 4,816 oz. to pounds.

11. Change 14 gal. 1 qt. 1 pt. 2 gi. to gills.

12. Change 12 bu. 2 pk. 1 qt. 1 pt. to pints.

13. What will $7\frac{1}{4}$ pieces of cloth cost, each piece containing 464 yd., if $\frac{3}{4}$ of a yard cost \$1.80?

14. From six hundred dollars and thirty-six cents take two hundred eighty-four and seventy-three hundredths dollars.

15. By selling a horse for \$185, I lost \$35. For how much should I have sold it to gain 8%?

16. A city of 36,000 inhabitants increases in a given time to 40,000. Find the increase per cent.

17. A grocer has 3 barrels of oil. The first contains $26\frac{3}{8}$ gal., the second $21\frac{5}{8}$ gal., and the third $19\frac{7}{12}$ gal. Find how much he has in the three barrels.

18. Find the cost of $15\frac{1}{2}$ doz. eggs at $18\frac{3}{4}$¢ a dozen.

1. Divide .0672 by .042.

2. Divide 2 by .0002.

3. Multiply .009 by .009

4. From .9 take 9 ten-thousandths.

5. Change to decimals: $16\frac{2}{3}$, $\frac{7}{15}$, $\frac{13}{20}$, $\frac{3}{8}$.

6. I bought $\frac{1}{2}$ of a store for \$1,400. At the end of the year I sold $\frac{1}{3}$ of my share for \$600. At that rate how much had my interest increased during the year?

7. How many dozen eggs at 24¢ a dozen will pay for 48 lb. of crackers at $7\frac{1}{2}$¢ a pound?

8. Add: $13\frac{2}{3}$, $15\frac{3}{5}$, $11\frac{3}{4}$, $18\frac{1}{2}$.

9. If a man travel 700 miles in $8\frac{3}{4}$ days, how far will he travel in $17\frac{1}{2}$ days?

10. Divide 28 by $2\frac{1}{2}$. 45 by $4\frac{1}{3}$.

11. A boy rides his bicycle $4\frac{1}{4}$ hr. in the morning, and $3\frac{2}{3}$ hr. in the afternoon. If he rides $8\frac{2}{3}$ miles an hour, how many miles will he ride in the day?

12. Find the prime factors of 84 and 90. Cross out those that are common to both numbers.

13. Do the same for 64 and 114.

14. Do the same for 63 and 108.

15. Draw the plan of the ground floor of a house of five rooms. Let the dimensions of the kitchen be 12×15; dining-room, 14×15, sitting-room, 15×18, bedroom, 12×16, parlor, 16×18. Find the cost of carpeting each room with material as follows: Kitchen and dining-room, linoleum, 85¢ a yard; bedroom, carpet, 75¢ a yard; sitting-room and parlor, carpet, \$1.12½. All one yard wide. Carpet to run in the most economical way. Find the cost of picture-molding for all the rooms at $9\frac{1}{2}$¢ a yard.

16. The remainder is $35,201\frac{5}{6}$, and the subtrahend $21,056\frac{3}{4}$. What is the minuend?

17. What number divided by $14\frac{5}{8}$ will give a quotient of 258?

ORAL.

1. By selling a knife for 75 cents, a boy gained 25% on the cost.

2. A boy received a half-peck of cherries for every bushel he picked. What per cent did he receive?

3. A horse was bought for $160, and sold for $120. What was the loss per cent?

4. Max divided 5 apples equally among 5 boys. What part of an apple did each receive?

5. Find the interest of $100 for 6 mo.

6. The width of a table is 4 ft., which is $\frac{4}{5}$ of the length. Find the length.

7. The width of a table is 4 ft., which is 80% of the length. Find the length.

8. 80 is 100% of what number?

9. A man having 400 acres of land, gave 25% of it to his son. How many acres did he give away?

10. The sum of two fractions is $\frac{3}{4}$. One of the fractions is $\frac{1}{3}$. What is the other?

11. If it takes $\frac{1}{16}$ of a yard of ribbon to make a badge, how many badges can be made from $\frac{7}{8}$ of a yard of ribbon?

12. Bought 10 bu. of peaches at $1 a bushel, and sold them at 30¢ a peck. How much was gained?

13. How many breadths of carpeting a yard wide will cover a floor 18 ft. wide? If the room is 21 ft. long, how many yards of carpeting will be needed?

14. I had $120. I spent $\frac{1}{3}$ of it for a watch, $\frac{1}{4}$ of it for an overcoat, and $\frac{3}{10}$ of it for board. What did I pay for each? How many dollars did I have left?

15. Rewrite example 14, using per cents instead of fractions.

16. At 10¢ a square foot, what will 3 sq. yd. of tin cost?

17. If a man can do a piece of work in 5 days, how much of it can he do in one day?

1. A farmer left at a store 37 doz. eggs and 33 lb. butter. The grocer allowed him 23½¢ a dozen for his eggs, and 32½¢ a pound for his butter. The farmer bought 2 lb. tea @ 87½¢, and 3 yd. cloth @ $1.37½ a yard. How do their accounts stand?

2. Find the cost of building a sidewalk 27 ft. long, 9 ft. 9 in. wide, at 65¢ a square yard.

3. A man bought 39 boxes of oranges at $2.85 a box, and sold them at $3.35 a box. Find the gain.

4. Make out a bill, supplying blanks: 11 bbl. apples @ $2.25; 17 bu. quinces @ $1.35; 19 bu. plums @ $1.48; 12 bu. pears @ 88¢; 45 baskets peaches @ $1.12½; 46 bu. cherries @ $1.00.

5. Read: 1,010,100.001.

6. At a flour-mill, $2,850 was paid for wheat. It made 587 bbl. of flour, which were sold at $6.25 a barrel. If the cost of milling was $583, find the gain.

7. Add in two minutes:

4763	1783	642	4124
5179	2941	1234	6795
362	8642	5678	476
1798	167	9012	79
3479	43	98	563
167	4788	1478	1208
54	1689	963	4967

NOTE. — To train the mind in concentration, it is often a good plan to limit pupils in time.

8. Read: 15,000,400.063.

9. Add:

yr.	mo.	da.	hr.	min.	sec.
2	7	15	14	28	39
9	11	18	6	49	27
26	7	19	23	19	28
11	8	17	21	47	56
16	9	8	5	50	38

... pay for 6 yd.

... made from

... $\frac{1}{2} \div \frac{1}{4} = ?$

... $\frac{1}{2} - \frac{1}{4} = ?$

... $5\frac{1}{2} - 5\frac{1}{4} = ?$

... $8\frac{1}{2} - 8\frac{1}{3} = ?$

... $1\frac{1}{2} - 1\frac{1}{3} = ?$

... $4\frac{1}{2} - 4\frac{1}{4} = ?$

... How many

... gal. cost?

... sold $2\frac{1}{2}$ pk. at

... many pecks

... $\frac{1}{2} - \frac{1}{4} = ?$

... $\frac{1}{2} - \frac{1}{4} = ?$

... $\frac{1}{2} - \frac{2}{3} = ?$

... $1\frac{1}{2} - \frac{2}{3} = ?$

... as much.

... buy

... $1\frac{1}{2}$

... pay

... bought

Perform as examples in addition, then in subtraction.

1. $71\frac{3}{4} \pm 47\frac{5}{8}$ $91\frac{2}{3} \pm 42\frac{1}{8}$ $65\frac{1}{4} \pm 46\frac{1}{3}$
$26\frac{1}{12} \pm 16\frac{7}{8}$ $74\frac{2}{3} \pm 18\frac{3}{4}$ $48\frac{4}{5} \pm 28\frac{5}{6}$

2. A rectangular lot of land containing 5,250 sq. ft. is 125 ft. long. How wide is it?

3. If .9 of a ton of coal costs \$5.67, what must I pay for 71.25 tons?

4. A pile of wood contains 60 cd. If it is 4 ft. wide and 6 ft. high, how long is it?

5. How many cubic feet are there in a tank 15 ft. 3 in. long, 12 ft. 6 in. wide, and 8 ft. deep?

6. What is the cost of fencing a field 12 rd. square at 13¢ a foot?

7. Reduce to common fractions: .95; .525.

8. Divide 96 thousandths by 384 hundred-thousandths.

9. Make and perform an example to illustrate division of fractions.

10. Two persons start from the same place and travel in opposite directions, one at the rate of $6\frac{1}{3}$ miles, and the other $8\frac{3}{4}$ miles an hour. How far apart will they be in $43\frac{1}{4}$ hours?

11. If the circumference of a circle is 44 in., how far is it from the center to the circumference?

12. A owns $\frac{3}{5}$ of a house, and sells 25% of his share for \$270. What is the value of the house?

13. At 45¢ a load, what will it cost to dig a cellar 21 ft. wide, 48 ft. long, and 6 ft. deep?

14. With scale $\frac{1}{2}$ in. to 4 in., make a drawing to represent the entire surface of a box 16 in. long, 8 in. wide, and 4 in. high. Find the area of the surface.

15. With scale 1 inch to 4 rods, draw a rectangle to represent a field 12 rd. by 15 rd. In the upper left hand corner cross off a piece 5 rd. × 3 rd., and in the lower right hand corner a piece 6 rd. by 3 rd. Find the area and perimeter of the part left.

1. At $86 a month, what is the rent of a house for 1 yr. 10 mo.?

2. If 2 lb. 4 oz. of candy cost 72 cents, what will 17 lb. 12 oz. cost?

3. Find the interest on $240 for 1 yr. 1 mo. 18 da. at 6%.

4. Find 7½% of $480. 6¼% of $8.64.

5. How many square feet in a sidewalk 10 ft. wide round the outside, of a lot 250 ft. by 160 ft.? Make diagram.

6. How many less feet would there have been in the walk if it had run just inside of the lot?

7. How many boards 15 ft. long and 6 in. wide will be required for a close board fence 110 yd. long and 7½ ft. high?

8. A floor is 8 yd. long and 6½ yd. wide. If all my boards are 12 ft. long, 6 in. wide, how many boards will it take to cover the floor? How must I place the boards so as to waste no time in cutting?

9. A tight board fence surrounds a lot 180 ft. by 90 ft. If the fence is 6 ft. high, find the cost of painting it at 37½¢ a square yard.

10. Reduce $\frac{44}{770}$ to a decimal fraction.

11. Add 63.43, .475, 11.674, 1.02.

12. If a man can row a mile in 9 min. 15 sec., how long will it take him to row 48 miles?

13. Change 1,495 lb. to ounces.

14. Change 1,120 rd. to miles.

15. Change 72 yd. 8 in. to inches.

16. Divide 12.3125 by .00625.

17. A dealer sold $\frac{5}{12}$ of his wheat to A, $\frac{1}{3}$ of it to B, $\frac{5}{18}$ of it to C, and had 630 bu. left. How much had he at first?

18. If $\frac{3}{8}$ of a cord of wood cost $3.25, what will $2\frac{3}{4}$ cd. cost?

19. Mr. Jackson received $13,044 for his share of a mill. If he owned $\frac{4}{9}$ of it, find the value of the whole mill.

20. If 14 tons of coal cost $91, what is the cost of $2\frac{1}{2}$ tons?

ORAL.

1. How many apples must be cut up to give 24 boys $\frac{2}{3}$ of an apple each?

2. If I buy stoves at \$12 each, and sell them at $8\frac{1}{3}\%$ profit, what shall I gain?

3. A horse was bought for \$100, and sold for \$95. What was the loss per cent?

4. A barrel of pork cost \$12, and was sold for \$11. What was the loss per cent?

5. A bought a horse for \$150, and sold it for \$180. What was his gain per cent?

6. B bought a horse for \$100, and sold it for \$109. What was his gain per cent?

7. \$24 is $\frac{3}{5}$ of twice as much as a coat cost. What was the cost of the coat?

8. 72 is $\frac{8}{9}$ of how many times $\frac{3}{4}$ of 12?

9. 36 is $\frac{3}{4}$ of how many times $\frac{2}{3}$ of 12?

10. 48 is $\frac{3}{5}$ of how many times $\frac{1}{2}$ of 18?

11. 56 is $\frac{8}{9}$ of how many times $\frac{7}{8}$ of 8?

12. If my wages in 8 weeks amount to \$48, what will be my wages in $2\frac{3}{4}$ weeks?

13. $\frac{5}{7}$ of 56 is $\frac{5}{6}$ of how many times 8?

14. $\frac{3}{5}$ of 36 is $\frac{3}{4}$ of how many times 12?

15. 30 is $\frac{5}{6}$ of how many times $\frac{1}{2}$ of 12?

16. A man sold a cow for $1\frac{3}{8}$ times what she cost him, and by so doing gained \$12. How much did the cow cost him?

17. If your sister Jessie paid $\frac{3}{5}$ of 12 dimes for a pair of gloves, how many cents did she pay?

18. Find the cost of your brother's watch, if \$25 is $\frac{5}{7}$ of the cost of it.

19. A wagon was sold for \$90, which was $\frac{4}{5}$ of what it cost. How much did it cost?

20. What per cent of my money is $\frac{3}{5}$ of it?

1. A merchant had 33 yd. of muslin. He sold 12½ yd. to one lady, 9¾ to another, 7½ to another. What is the rest worth at 33½ cents a yard?

2. Add 4 and 7 tenths, 86 thousandths, 75 and 3 thousandths, 13 hundredths.

3. Add: 42⅜, 19⅝. 37½, 60⅞.

4. Subtract: 64⅜ − 39⅝. 56⅛ − 29⅝.

5. Arthur E. Ruddy bought of John E. Smith, Mar. 1, 60 lb. sugar @ 5½¢; 3 lb. tea @ 62½¢. Mar. 10, 15 lb. coffee @ 18¢; 2 bbl. flour @ $6.25. Apr. 10, he paid $15, and bought 24 bars soap @ 16⅔¢; 38 lb. starch @ 7½¢. Make an itemized bill April 1. A statement and bill April 15.

6. Divide 2⅓ by 1⅚.

7. Multiply ⅞ by 4⅓ times 3⅜.

8. A merchant bought 37 bbl. of flour at $5.88 a barrel, and 745 yd. cloth at 35¢ a yard. He sold the flour at $6.68 a barrel and the cloth at 29¢ a yard. Did he gain or lose? and how much?

9. How many bags, each holding 49 lb., will it take to hold 35 bbl. of flour? A barrel of flour weighs 196 lb.

10. Three pieces of cloth bought at $3 a yard cost $225. The first piece contains 27½ yd., the second contains 33⅓ yd. How many yards are there in the third piece?

11. Find the square feet in a rectangle 13 ft. 4 in. by 24 ft. 6 in.

12. Find the square feet in a rectangle 17⅜ ft. by 9½ ft.

13. Divide 424,368 by 1,008.

14. Divide 10,248 by 84.

15. Divide 196.3 by .013; by .13; by 1.3.

16. What will a pile of wood 125 ft. long, 8 ft. high, and 4 ft. wide cost, at $4.50 a cord?

17. If a man's salary is $1,800, and his expenses $1,260 a year, what per cent of his income is he able to save?

1. With scale 1 inch to 4 feet, make a diagram for a room 18 ft. by 12 ft., having a projection on one end 10 ft. by 4 ft. Find the cost of carpet at 87½¢ a yard, breadths 1 yd. wide, and running lengthwise.

2. At 6½¢ a foot, find the cost of molding for this room.

3. At 18¢ a square yard, find the cost of plastering, if the room is 9½ ft. high.

4. I owned ⅔ of a farm, and sold ¾ of my share for $1,350. Find the value of the whole farm.

5. A man exchanged cloth at 17½¢ a yard for 74¼ bu. potatoes at 64¢ a bushel. How many yards did he receive?

6. Multiply 26⅝ by 9⅓. 32⅜ by 8⅐.

7. From a hogshead of molasses containing 47 gal. 3 qt. there were sold 29 gal. 1 pt. What was the remainder worth at 12½¢ a quart?

8. Bought a carriage for $160, and paid 10% of the cost for painting, and then sold it 25% above the total cost. Find the selling-price.

9. Find the area of the following triangles:

Base 16 yd., altitude 40 ft.

Base 4 ft. 6 in., altitude 3 ft. 9 in.

Base 18 in., altitude 2 ft. 4 in.

10. Find the interest on $780 for 1 yr. 4 mo.

11. Make a bill containing both debit and credit items.

12. If ⅘ of a yard of cloth cost $1.20, what will 2⅔ yd. cost?

13. Find the cost of 19⅔ yd. of cloth at 16½¢ a yard.

14. How much will it cost me to insure goods worth $20,470 at 1½%?

15. How much a year does a clerk earn, if he earns $76⅔ a month?

16. What will 2½ pk. of wheat cost at 1⅓¢ a pound, allowing 60 pounds to the bushel?

1. A merchant had 33 yd. of muslin. He sold $12\frac{1}{2}$ yd. to one lady, $9\frac{3}{4}$ to another, $7\frac{1}{8}$ to another. What is the rest worth at $33\frac{1}{3}$ cents a yard?

2. Add 4 and 7 tenths, 86 thousandths, 75 and 3 thousandths, 13 hundredths.

3. Add: $42\frac{3}{8}$, $19\frac{1}{3}$. $37\frac{1}{2}$, $60\frac{5}{7}$.

4. Subtract: $64\frac{3}{4} - 39\frac{3}{5}$. $56\frac{1}{3} - 29\frac{3}{5}$.

5. Arthur E. Ruddy bought of John E. Smith, Mar. 1, 60 lb. sugar @ $5\frac{1}{2}¢$; 3 lb. tea @ $62\frac{1}{2}¢$. Mar. 10, 15 lb. coffee @ $33¢$; 2 bbl. flour @ \$6.25. Apr. 10, he paid \$15, and bought 24 bars soap @ $16\frac{2}{3}¢$; 38 lb. starch @ $7\frac{1}{2}¢$. Make an itemized bill April 1. A statement and bill April 15.

6. Divide $2\frac{1}{3}$ by $1\frac{5}{7}$.

7. Multiply $\frac{2}{3}$ by $4\frac{1}{2}$ times $3\frac{2}{5}$.

8. A merchant bought 37 bbl. of flour at \$5.88 a barrel, and 795 yd. cloth at $35¢$ a yard. He sold the flour at \$6.68 a barrel, and the cloth at $29¢$ a yard. Did he gain or lose? and how much?

9. How many bags, each holding 49 lb., will it take to hold 25 bbl. of flour? A barrel of flour weighs 196 lb.

10. Three pieces of cloth bought at \$3 a yard cost \$225. The first piece contains $27\frac{1}{2}$ yd., the second contains $33\frac{1}{3}$ yd. How many yards are there in the third piece?

11. Find the square feet in a rectangle 13 ft. 4 in. by 24 ft. 6 in.

12. Find the square feet in a rectangle $17\frac{3}{4}$ ft. by $9\frac{1}{2}$ ft.

13. Divide 424,368 by 1,008.

14. Divide 10,248 by 84.

15. Divide 196.3 by .013; by .13; by 1.3.

16. What will a pile of wood 125 ft. long, 8 ft. high, and 4 ft. wide cost, at \$4.50 a cord?

17. If a man's salary is \$1,800, and his expenses \$1,260 a year, what per cent of his income is he able to save?

1. Add 435.075, 21.07, .035, 2000.02.

2. Add four hundred and fifty-six hundredths, eight thousand four hundred and seventy-two thousandths; fifteen thousand seven hundred and twenty-one hundredths; forty-three million seven hundred thirty-three thousand eight hundred three and fifty-three thousandths.

3. A cattle-train is made up of 19 cars, and each car contains 117 sheep. If each sheep weighs 115 lb., what do all weigh?

4. If I buy 17 tons of iron at $37.65 a ton, and 39 tons at $43.85 a ton, what shall I gain by selling the whole at $44.83 a ton?

5. Divide 80,407,080 by 40,000.

6. If a man receives $65 a month, and spends $35 a month, in how many years will he save enough to buy a house worth $2,160?

7. I paid $55 each for 2 harnesses, and $145 for a carriage, and for a span of horses twice as much as for the carriage and harnesses. What was the cost of all?

8. A dealer paid $4,914 for 819 bbl. of flour, and sold it at $6.75 a barrel. Did he gain or lose? and how much?

9. A man bought 157 cows at $57 a head, and 89 at $64 a head. He paid $1.50 a head for transportation, and sold the lot for $15,457.50.

10. What are the prime factors of 40? 84? 250? 735? 9,800?

11. Find the factors common to 25, 45, and 70.

12. Reduce to improper fractions: $13\frac{5}{8}$, $14\frac{3}{8}$, $17\frac{3}{8}$, $18\frac{5}{19}$.

13. If 12 yd. of cloth cost $75, what is the cost of 8 yd. at the same rate?

14. How much silk can be bought for $514.14, if 51 yd. cost $13.18?

15. What will 89 horses cost at the rate of 23 horses for $150?

1. March 1, Joseph Thompson bought of Hopkins & Co. 3 yd. flannel @ 45¢; 2 pr. cuffs @ 33¢; 2 pr. hose at 33⅓¢. Mar. 11, he bought 4 yd. velvet @ 75¢; 2 yd. Hamburg @ 12½¢; 3 yd. lace @ 33⅓¢. April 8, he bought 7 yd. crash @ 9½¢; 5 yd. cotton @ 15¢. April 19 he paid cash $5. Make out an itemized bill May 1.

2. Change 18 bu. 2 pk. 6 qt. 1 pt. to pints.

3. Change 2,548 sq. in. to higher denominations.

4. Find the sum of 10 bu. 3 pk. 6 qt. 1.8 pt.; 8 bu. 2 pk. 4 qt. 1.1 pt.; 7 bu. 3 qt. 1.4 pt.; 5 bu. 7 qt. 1.3 pt.; 17 bu. 3 pk. 7 qt. 1.5 pt.

5. How many square feet in a walk 18.75 ft. long, and 2.8 ft. wide?

6. What is the cost of carpeting a room that is 17.25 ft. long and 15 ft. wide, at 87½¢ a square yard?

7. Find 8⅓% of 1,500 yards.

8. A and B commenced business, each with $6,456. A gained 25%, and B lost 25%. How much more was A then worth than B?

9. If an article that cost $7.75 is sold for $9.61, what is the gain per cent?

10. What must I pay for insuring $75,000 worth of property at 3% of its value?

11. What is the interest of $325.75 for 4 mo. 24 days?

12. What is the interest of $845 for 1 yr. 10 mo. 6 da.?

13. How many tons of hay will 9 horses eat in 27 weeks, if 6 horses eat 15 tons in the same time?

14. If ⅜ of a ship cost $6,348, what will ⅞ cost?

15. Find the convex surface of a cylinder whose altitude is 12 ft., and the radius of the base 3½ ft.

16. A flower-bed is 8 ft. long and 6 ft. wide. What will it cost, at 4¢ a square foot, to make a board walk, 2 ft. wide, round the outside?

cents and

55
25
40
50

sugar at 7c a

sold his horse
per cent

sells it at 16c.
gain on 12

and 9.
cost?
cents' worth

20
20

1. A house is 75 ft. long, 60 ft. wide, with 22 ft. posts. The roof has a one-fifth pitch, and the rafters are 22 ft. long. Find the square feet of surface in roof, walls, and floor.

2. Let 8 hours constitute a day's work. Deduct 20 cents an hour for under time, and give 50 cents an hour for over time.

	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Wages.
H	8 hr.	9 hr.	7 hr.	10 hr.	6½ hr.	7 hr.	$1.50
J	6	8½	7	9	4	8	1.25
K	7	6	6½	7	8	8	1.50
L	8	8½	4½	6½	8	10	2.00

3. If 2½ bu. of wheat cost $2, what will 85 bu. cost?

4. How many 3-in. squares can be cut from a sheet of paper 9 yd. long and 4 ft. wide?

5. Multiply .000075 by .000044.

6. At $6 a hundred, how many pounds of beef can be bought for $68.40?

7. Add $35\frac{1}{2}$, $74\frac{2}{3}$, $18\frac{3}{4}$.

8. The product of two numbers is 30,420, and one of them is 39. Find the other.

9. A man saves $\frac{1}{8}$ of his salary. If he spends $750 a year, what is his salary?

10. A man paid $240 for a cow and horse. If the horse cost three times as much as the cow, find the cost of each.

11. Find the cubic contents and entire surface measurement of a box 2 ft. long, 18 in. wide, and 14 in. deep.

12. The sum of three numbers is 48,245, and two of them are 12,347 and 8,748. Find the other number.

13. Make a bill for eight articles bought at a grocery store.

14. Find the value of 26,650 lb. of iron at $16.40 a ton.

15. Multiply $\frac{4}{5}$ of $\frac{3}{7}$ by $\frac{2}{3}$ of $\frac{1}{3}$.

16. Add $19\frac{3}{4}$, $11\frac{5}{8}$, $14\frac{3}{4}$.

ORAL.

1. Find the selling-price when the cost is $12, and the gain 12½%.

2. Find the selling-price when the cost is $15 and the loss is 66⅔%.

3. Find the selling-price when the cost is $2.50 and the gain 20%.

4. What is the interest of $50 for 60 days?

5. If 4 men can build a fence in 12 days, how many days will 9 men require?

6. The price of my coat was $6. I still owe 16⅔% of it. How much have I paid?

7. What is the interest of $10 for 24 days?

8. What is the interest of $12 for 10 months?

9. If ⅝ of a pound of candy cost 15 cents, what will ⅜ of a pound cost?

10. Take ⅔ of a number from it, and 36 remains. What is the number?

11. By selling for $8 I gain $2. What per cent of the cost do I gain?

12. If 9 balls weigh 45 oz., what will 13 balls weigh?

13. $15 is $\frac{3}{7}$ of what?

14. From $3\frac{1}{4}$ take $2\frac{1}{2}$.

15. If your brother earns $3 a week, and he pays 15 cents a day for dinner, and 60 cents a week for car-fare, how much can he save in a week for other expenses?

16. If a house cost me $1,200, for what must I sell it to gain 25%?

17. What is the interest of $5 for 1 yr. 10 mo. 12 days?

18. What is the interest of $200 for 1 yr.? For 2 yr.? For 6 mo.?

19. What is the interest of $500 for 1 yr.? For 1 yr. 6 mo.? For 2 yr. 6 mo.?

1. Find the area and the perimeter of a rectangular field 28 rd. long and 297 ft. wide.

2. Add: 24 rd. 5 yd. 1 ft., 4 yd. 10 in., 86 rd. 3 yd. 2 ft., 5 yd. 1 ft. 8 in.

3. At $.35 a square yard, how much will it cost to plaster a room 36 ft. long, 28 ft. wide, and 12 ft. high, allowing 383 sq. ft. for doors and windows?

4. A room is 18 ft. by 15 ft. The carpet is 27 in. wide. At $1.25 a yard, what will be the difference in price in carpeting the room if the breadths run widthwise instead of lengthwise?

5. A cellar wall, measured on the outside, is 36 ft. long, 28 ft. wide. If it is 7 ft. high and 18 in. thick, how many cubic yards of masonry does it contain?

6. A and B together have 786 acres of land, and A has 174 acres more than B. How many acres has each?

7. A farmer sold $\frac{1}{2}$ of his wheat to one man, $\frac{1}{3}$ to another, and had 147 bu. left. How many bushels did he raise?

8. Find the cost of 2,950 pickets at $3.15 a C.

9. If .75 of a ton of hay is worth $15.90, how much are 12.25 tons worth at the same price?

10. A rectangular field 30 rd. wide contains $4\frac{1}{2}$ acres. How long is it?

11. A can do a piece of work in 7 days, and B can do it in 8 days. In how many days can both working together do it?

12. Find the interest at 6% of $245 for 1 yr. 10 mo. 18 da.

13. My house is insured for $4,000 at $1\frac{1}{4}\%$. What is the premium?

14. An agent sold $4,460 worth of goods at 2% commission. What was his commission?

15. A merchant lost $340, which was 17% of all his money. How much money had he?

16. How many feet of lumber at $24.40 a thousand cost $675.27?

1. What per cent of 900 is 180? Of $\frac{1}{2}$ is $\frac{1}{4}$?

2. A man sold a piano for \$780, and gained 30%. What was the cost?

3. A house cost me \$5,250. I paid \$375 for painting it. I sold it so as to gain 15%.

4. A man bought a farm for \$3,000, and sold it for \$4,500. What per cent did he gain?

5. A grain elevator contains 8,120 bu. of wheat. If $12\frac{1}{2}$% is destroyed by fire, what is the loss, if wheat is worth $87\frac{1}{2}$ cents a bushel?

6. A merchant bought 90 boxes of butter at \$2.50 a box, and sold it so as to gain 20%.

7. 46.53 is 1% of what number?

8. 336 men are 16% of how many men?

9. A house and furniture worth \$9,612 were destroyed by fire. The insurance was \$6,408. What was the loss? What per cent of the whole value was the loss?

10. What is $5\frac{1}{2}$% of \$1,000? Of \$7,280?

11. At \$3.75 a thousand, what is the cost of shingling a roof 45 ft. long, each side 25 ft. wide, if 8 shingles cover a square foot?

12. What will it cost to plaster a wall $32\frac{2}{3}$ ft. long, and 9 ft. high, at 27¢ a square yard?

13. Find the number of boards needed for flooring a building 850 ft. long by 688 ft. wide, each board being $12\frac{1}{2}$ ft. by 6 in.

14. What is the interest of \$300.50 for 1 yr. 6 mo. at 6%?

15. What is the interest of \$950.70 for 9 mo. at 6%?

16. What is the interest of \$4,680.52 for 4 yr. 6 mo. 18 da. at 6%?

17. What will it cost to paint the walls of a room $54\frac{3}{4}$ ft. long, 36 ft. wide, $10\frac{1}{4}$ ft. high, at 75¢ per square yard?

18. B owned $\frac{3}{5}$ of a farm, and sold $\frac{1}{3}$ of his share for \$6,400. What was the farm worth?

1. What is the entire surface of a square pyramid whose slant height is 8 ft., and the sides of whose base are each 5 ft.?

2. Find the entire surface of a cone whose slant height is 60 ft., and the circumference of base 44 ft.

3. What is the convex surface of a log 35 in. in diameter, and 10 ft. long?

4. What is the interest of $78.45 for 1 mo. 6 da. at 6%?

5. What is the interest of $955 for 5 yr. 3 mo. 12 da. at 6%?

6. B's property is valued at $2,500. If the rate of taxation is 1½%, what tax must B pay?

7. I paid $54 to insure my house, valued at $3,600. What was the rate?

8. $12¼ is what per cent of $61¼?

9. An agent sold $12,350 worth of goods for me, and charged me 1½% for his services. How much did I pay him?

10. George bought a sled for $1.20, and sold it for $1.40. What was his gain per cent?

11. 150 is 60% of what number?

12. What per cent of 24 acres is 15 acres?

13. A has $1,800 more than B, and together they have $6,500. How much has each?

14. If 12 bu. of wheat cost $10.80, what will 25 bu. cost?

15. Add 12 m. 239 rd. 12 ft. 7 in.; 16 m. 258 rd. 5 ft. 7 in.; 10 m. 232 rd. 4 ft. 6 in.

16. Reduce 796,864 lb. to tons.

17. If iron is worth $33.50 a ton, what is the value of 15,640 lb.?

18. A house is 45 ft. wide, 60 ft. long, with 20 ft. posts. The roof has a one-fifth pitch, and the rafters are 25 ft. long. Find the square feet in roof, walls, and three floors. At $2.25 per M., find cost of shingling, supposing that 1,000 shingles will cover 100 square feet. At 25¢ a square yard, find cost of painting outside walls.

1. What are the prime factors of 1440?

2. If $5\frac{1}{2}$ tons of hay cost \$80, what will $7\frac{3}{4}$ tons cost?

3. If $\frac{3}{4}$ of a farm cost \$4,200, what is $\frac{5}{7}$ of it worth?

4. A man paid \$58 for a harness, \$165 for a carriage, and for a horse as much as for the carriage and harness. What was the cost of all?

5. What will $36\frac{3}{4}$ tons of hay cost at $\$18\frac{7}{8}$ a ton?

6. If $\$16\frac{1}{4}$ will buy $2\frac{1}{3}$ cords of wood, how many cords will $\$74\frac{3}{4}$ buy?

7. If a man paid \$4,234.375 for 67.75 acres of land, what was the price an acre?

8. How many square feet in a board which is 18.25 ft. long and 2.8 ft. wide?

9. The population of a certain city is 18,775. What will it be in two years from this time if it gains 8%?

10. A man owes me \$3,460. If he pays me 30%, how many dollars does he pay me?

11. What per cent of \$745 is \$149?

12. A merchant having \$1,000, deposited \$650 in a bank. What per cent of his money did he deposit?

13. A man saves \$500 annually. If this is $12\frac{1}{2}$% of his salary, how much is his salary?

14. Bought a farm for \$4,200, for what shall I sell it to gain 5%?

15. Find the interest on \$1,250 for 2 yr. 3 mo. 12 da. at 6%.

16. The base of a triangular lot is 244 feet, and the altitude 108 feet. What is the area?

17. What is the area of a circle whose circumference is 22 inches?

18. What is the surface of a prism whose length is 20 inches and base 6 inches square?

19. Find the surface of a cylinder whose length and diameter 7 feet.